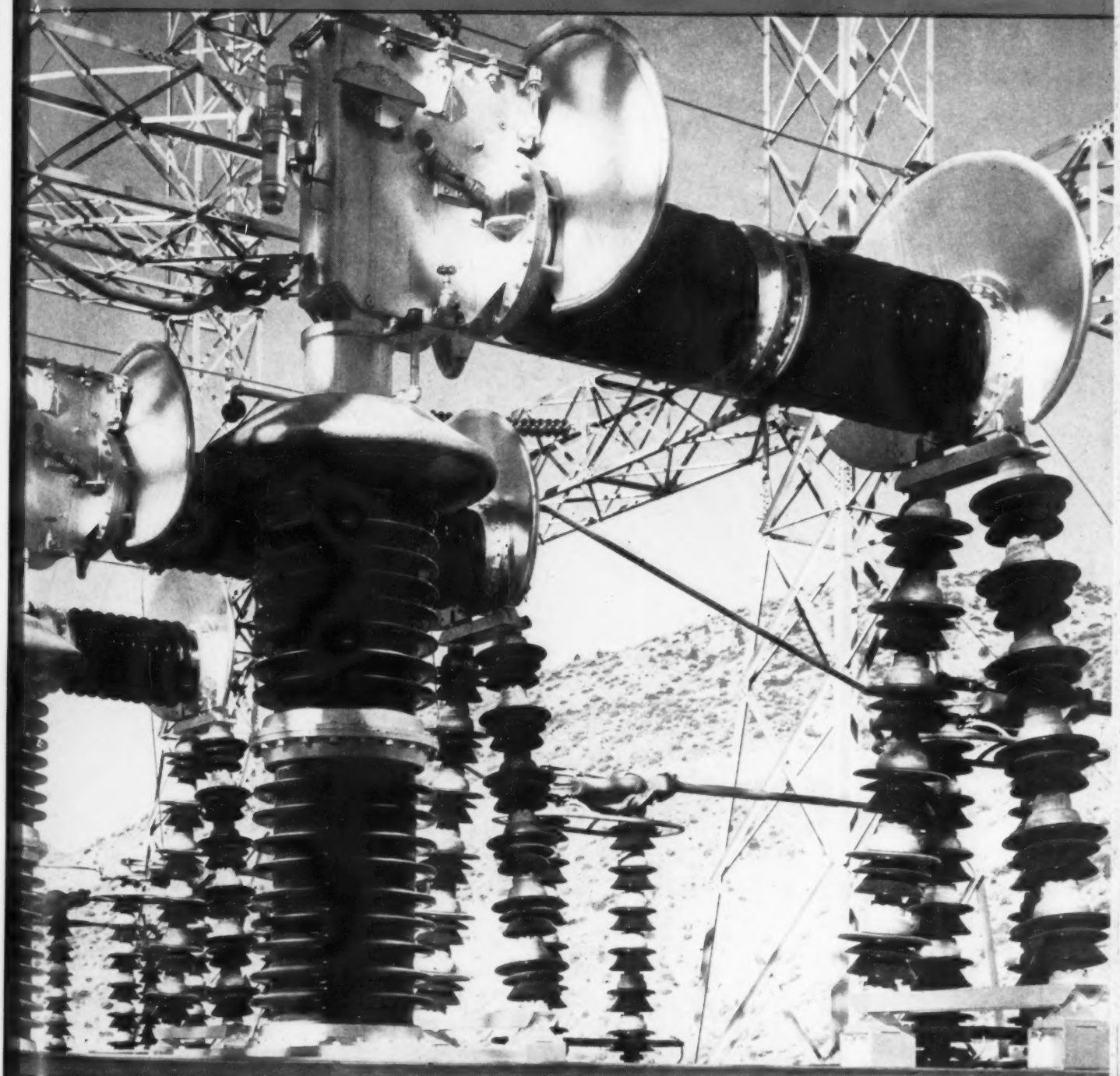
ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.



28th Annual Review and Forecast • February 1947 • 25c

"Be courageous. Be as brave as your fathers before you. Have faith. Go forward."

Thomas Alva Edison, in these words, gave his last official message to the electrical industry. On the hundredth anniversary of Edison's birth, we of this industry need no greater command, no brighter beacon to guide us on the course that this great captain charted. Into our hands, Thomas Alva Edison has given the torch of light and of enlightenment. It is ours to carry with courage and in faith—always forward.

Thomas Alva Edison, the great humanitarian, stands alone as a man of all nations, one who brought light when light was needed, who gave new tools to industry and who unfettered the hands of women in their homes. His life, dedicated to the welfare of his fellow men, has been and forever will be, an inspiration to each succeeding generation. His spirit, and the good of his works, will live forever.

SOUTHERN CALIFORNIA EDISON COMPANY

Edison

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), February, 1947. Vol. 98, No. 2. Published monthly by the McGraw-Hill Company of California, 68 Post St., San Francisco 4, Calif. Entered as second class matter May 7, 1906, at the post office of San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U.S.A. Subscription rates—U.S., U.S. Possessions and Latin American Republics: $2, 1 year; $3, 2 years; $4, 3 years. Canada: $2.50, 1 year; $4, 2 years; $5, 3 years. Other countries: $3, 1 year; $5, 2 years; $6, 3 years. Single copy, 25c. Copyright, 1947. McGraw-Hill Company of California. All rights reserved.

Febr

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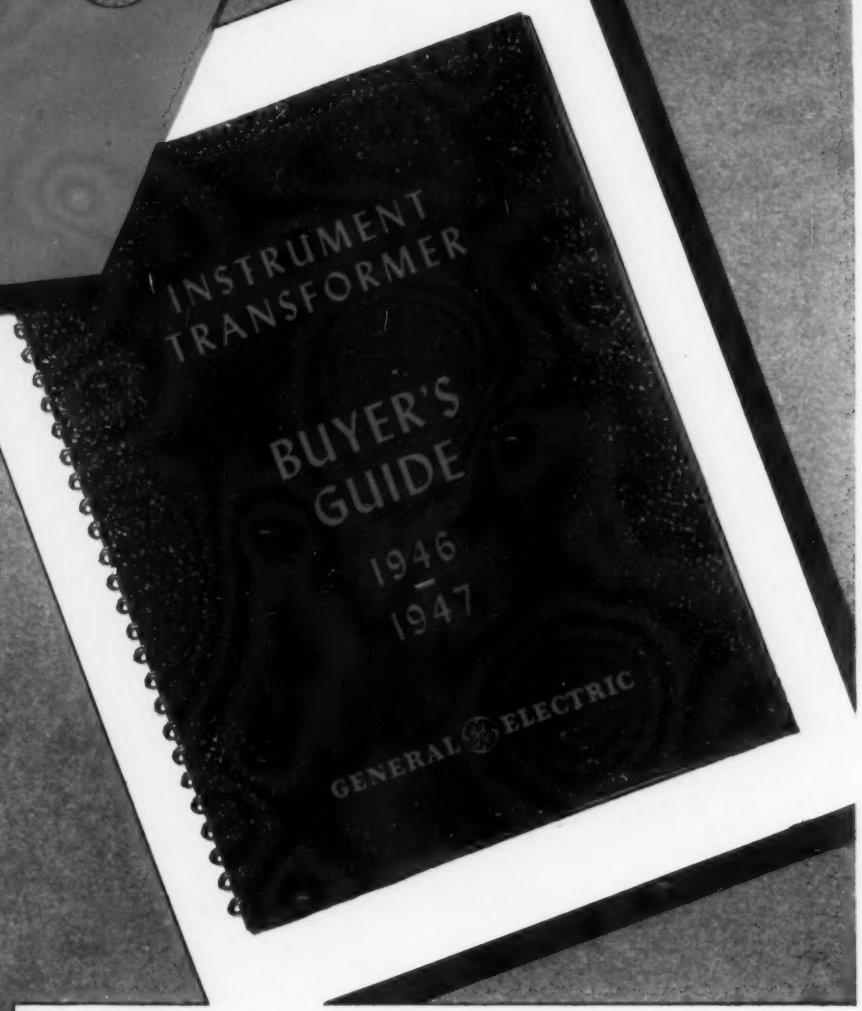

TO help you with your selection of standard G-E instrument transformers, we have just published our first, complete, simplified Buyer's Guide.

Sturdily bound and attractively designed, this easy-to-read booklet contains information on more than 100 standard types of G-E instrument transformers for both indoor and outdoor use. Under the pictorial references on each page, we have highlighted the important information on prices, ratings, and ASA accuracy classifications.

Where you need more detailed data, such as accuracy curves, outline dimensions, and complete description, simply call or write the nearest G-E office for your copy of the supplementary bulletin which is conveniently referenced at the bottom of each applicable page. *Apparatus Department, General Electric Company, Schenectady 5, N.Y.*

CLIP AND MAIL THIS COUPON TODAY

YES I need a copy of the "Buyer's Guide" (GEA-4626) to help me in the selection of instrument transformers.

Name.....

Company.....Title.....

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City.....State.....

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MAIL TO: General Electric Co., Section C604-18, Schenectady 5, N. Y.

GENERAL ELECTRIC

ELECTRICAL WEST

VOL. 98 FEBRUARY 1947 NO. 2

A Dynamic Future 65

Highlights of electric utility operations in the Far Western States; comparisons of Western with the national operations.

$270,000,000 All-Time High for Added Facilities in the West 68

The construction record for 1946; scheduled plant additions for present year as reported by managers and engineers.

Still Plenty Rugged in 1947, But What a Market 88

Western utilization men report on merchandising policies, on kilowatt-hour sales, market saturation and probable demand.

"Fustest With the Mostest" 106

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Engineering	68	Profiles	150

Cover photo by U. S. Bureau of Reclamation

CHANGE OF ADDRESS

Circulation Manager,
Electrical West,
68 Post St.
San Francisco, Calif.

Please change my address

From .....

To .....

Signed .....

People

Make the Facts and Figures

In a summary of the past year and a projection into the present year, results have to be told in figures as well as facts. Figures are the measures of accomplishment. They are also used to set the goals for future achievement. Figures represent realities, not mere wishes or hopes or theories for they are used to measure quantity. The wise reader will respect and study figures with a yardstick of his own, like the man in the song, "chalkin' and a huggin'."

The authors this month are all those who cooperated to contribute these figures. They are too numerous to list but the staff as well as the readers are grateful to them for the work that these facts and figures represent and for the values all can derive therefrom.

Preview

Engineering Features

How Pacific Gas and Electric Co. uses buses instead of junction boxes on secondaries in manholes in heavy-load areas will be described by R. A. Moulthrop, PG and E, Oakland. The scheme was originally described at the PCEA discussion of economy measures for underground; the article consists of that presentation with added details and pictures.

G. A. Stockwell of the testing laboratories of the Los Angeles Department of Water & Power will detail an interesting test set-up whereby that system obtained data on the dielectric strength and interrupting capabilities of fuse cut-outs for 4,800-volt service.

New Dress

To give you facts at a glance, to save you time, and to keep you posted, up to the minute, on all phases of electrical activities, ELECTRICAL WEST is forthcoming in a new dress. The new model ELECTRICAL WEST is designed for clean, clear, quick picturing of the facts most vital to your work.

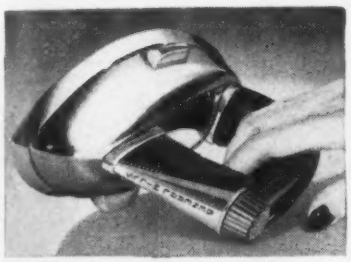
General Mills' Tru-Heat Control!

MOST ACCURATE KNOWN TYPE OF HEAT REGULATOR EVER USED IN AN IRON

Betty Crocker SAYS:

"Many modern washable fabrics are extremely sensitive to heat. To iron them safely irons must have more accurate temperature controls than ever before."

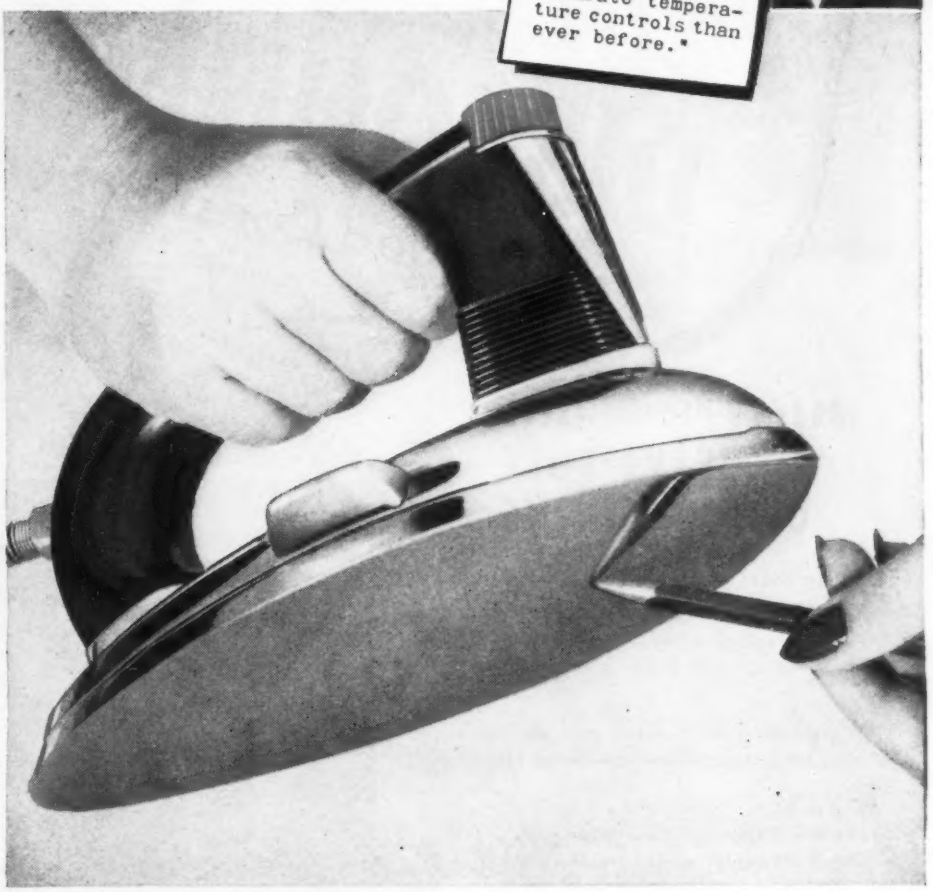
TRU-HEAT FABRIC SELECTOR. Iron every fabric at its own best temperature by setting the Tru-Heat Fabric Selector. Or iron by actual temperatures. Fabric Selector, marked both ways, follows recommendations of Good Housekeeping Institute.



SAFETY SIDE REST. Iron stays put on its low Safety Side Rest with little danger of tipping. What's more, it takes 15% less effort to roll it on its side than to lift an iron up onto a heel rest or stand. What a practical way to make ironing easier and safer!

4-WAY, FULL-VUE IRONING SURFACE covers more ironing at every stroke because it's 15.7% larger, 28% longer than the average of five other leading irons. New shape irons easily into difficult places with either end. Button Saver Edge slants *all around* so any part of it slips smoothly under buttons without loosening threads.

RIGHT WEIGHT. Accurately controlled heat does the job—not weight. Iron weighs only 3¾ lbs., the *right* weight for faster, easier ironing.



THE SURFACE THAT IRONS THE FABRIC is actually part of the General Mills Tru-Heat Control. This great new invention prevents dangerous overheating and time-wasting drops in temperature. It's the fastest-acting, most accurate known type of heat regulator used in automatic irons. Accurately controlled heat not only protects delicate fabrics but speeds ironing and makes every piece of ironing look smoother, more neatly finished. Tru-Heat Control is only one of the standout advantages of this new iron that's winning thousands of women in market after market. Homemakers are reading the whole story in hundreds of large newspaper ads . . . hearing it on General Mills' famous Radio Hour wherever distribution is under way . . . and they're showing their approval of it by buying the new General Mills Iron!

The iron sponsored by Betty Crocker

NOW BEING DISTRIBUTED IN:
Minnesota, Nebraska, the Dakotas, Wisconsin, Iowa, Michigan, Indiana, Ohio, the New England States, New York, Montana, Wyoming, Utah, Colorado, New Mexico, and parts of Idaho, Illinois, Kentucky, West Virginia, Pennsylvania and New Jersey.

GENERAL MILLS, INC., HOME APPLIANCE DEPT., MINNEAPOLIS 13, MINN.

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Betty Crocker is a trade name of General Mills.

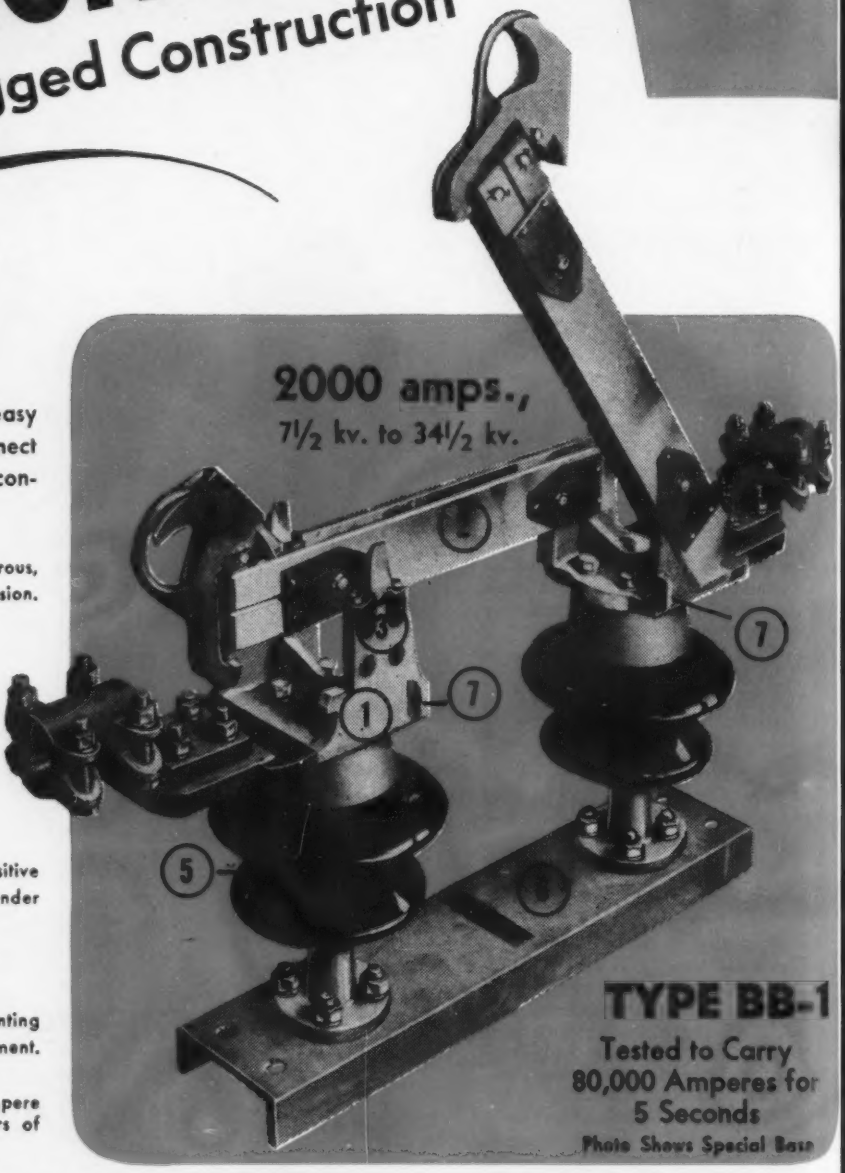
Trouble-Free DISCONNECTS of Rugged Construction

Made by PACIFIC ELECTRIC for HEAVY-DUTY OUTDOOR SERVICE

FOR long years of trouble-free service and easy operation, here's a rugged outdoor disconnect that can be relied on to carry the full load continuously.

1. All parts above insulator caps are non-ferrous, including bolts, nuts and washers—to prevent corrosion.
2. Two double blades with spacers are of hard-drawn high-conductivity copper. Metals of different hardness prevent galling. Rugged blade stops (7) are built in.
3. Contacts of long wipe have small area and high-units pressures and are silvered on tongue and hinge ends.
4. Safety latches of pry-off type are heavy, positive and easily releasing. Opening of switch easily, under thick ice, is assured.
5. Insulators are N. E. M. A. Standard B. I. L.
6. Bases of formed heavy steel, with flat mounting surfaces, assure easy installation and perfect alignment.

Ask for full details about our Type BB-1, 2000-ampere disconnects of rugged construction for long years of trouble-free service.



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I look for all 8 to get t.f.e.

True Fastener Economy

It is the many costs of using a fastener that count . . . not just the initial price. *True Fastener Economy* is the lowest *total* cost for fastener selection, purchase, assembly and performance.

YOU GET t.f.e. WHEN YOU . . .

1. Reduce assembly time to a minimum by savings through use of accurate and uniform fasteners

2. Make your men happier by giving them fasteners that make their work easier

3. Reduce need for thorough plant inspection, due to confidence in supplier's quality control

4. Reduce the number and size of fasteners by proper design

5. Purchase maximum holding power per dollar of initial cost, by specifying correct type and size of fasteners

6. Simplify inventories by standardizing on fewer types and sizes of fasteners

7. Save purchasing time by buying larger quantities from one supplier's complete line

8. Contribute to sales value of final product by using fasteners with a reputation for dependability and finish

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

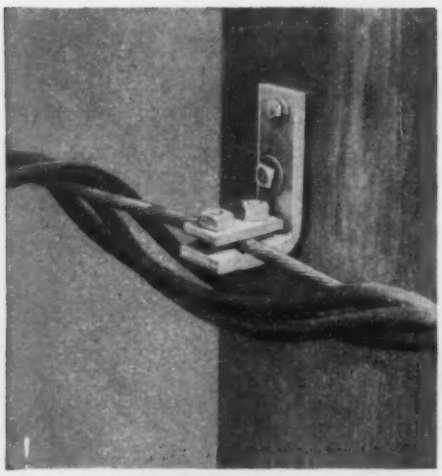
102 years making strong
the things that make America strong

Plants at Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at Philadelphia, Detroit, Chicago, Chattanooga, Portland, Seattle. Distributors from coast to coast. By ordering through your distributor, you can get prompt service for your normal needs from his stocks. *Also*—the industry's most complete, easiest-to-use catalog.

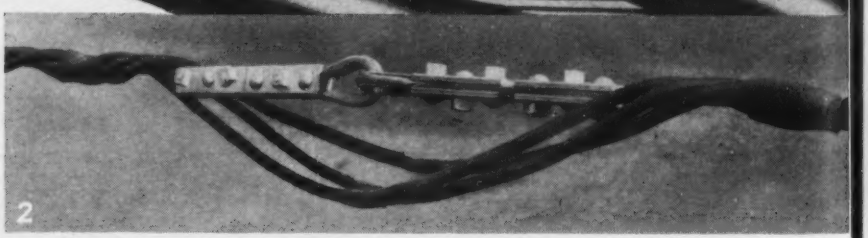
New-Type Self-Supporting

NEW METHOD U·S·S Amerprene Cable runs right through trees. Constant tree trimming is eliminated. The line is easy to install, better looking, promises fewer interruptions to service and pays for itself by reducing maintenance and repairs.
CONSTRUCTION DETAILS
1. Heavy galvanized steel messenger with copper wires inserted for conductivity
2. Copper conductors.
3. High dielectric strength insulation.
4. Amerprene conducting cover similar to tire-tread rubber.
Note the simplicity of this construction and the elimination of metal tapes or rings. Installation is easy, splices and taps can be made quickly and safely.
1
2
3
4

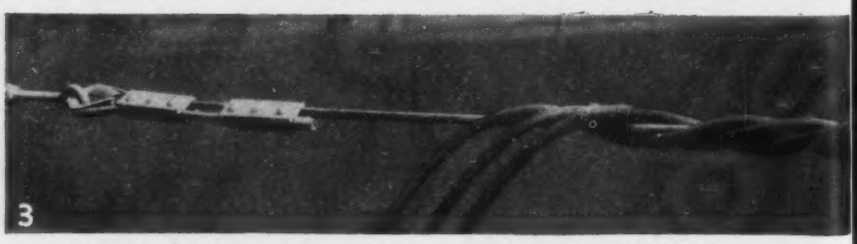
EASY INSTALLATION...



1. POLE HANGER clamps steel messenger cable eliminating the strain on conductors. No crossarms or insulators needed.



2. SPLICE. Steel messenger is clamped as shown. All three conductors are then bound to messenger with heavy marlin. Each conductor can then be easily spliced.



3. TERMINATION. Messenger is clamped as shown and conductors can be terminated in transformer or pothead or run directly to a tap bracket.

U·S·S Amerprene *Self Supporting*

Amerprene Aerial Cables

PROVIDE BETTER CONTINUITY OF SERVICE THROUGH HEAVY TREES

at low cost!

THE PROBLEM of maintaining continuity of electric service through heavily wooded areas has been difficult, but the new U·S·S Amerprene Self-Supporting Aerial Cable promises an economical solution. Many types of aerial cable, some self-supporting, have been tried in the past but most of them had certain disadvantages which have been overcome in this design.

Look at the simplicity of the U·S·S Aerial Cable —three conductors wound around a strong steel messenger. The cable is balanced in construction—requires no troublesome straps or rings.

With this cable you can practically eliminate tree troubles and the high cost of tree trimming. Unsightly wire congestion in residential areas can soon be a thing of the past and you will not have to resort to the more expensive underground cable.

One big question was how to obtain maximum protection against normal static discharges and lightning and switching surges which might run much higher than normal operating voltage. Comprehensive tests showed that Amerprene conducting rubber covers promised better operating results than non-shielded cable. (Safe methods of splicing and terminating conductors were devised so that the line can be worked "hot" if necessary.)

The installation of these self-supporting cables is economically sound. You can use shorter, less costly poles. Crossarms and insulators are unnecessary except at a few points, and there is less danger of line breaks because of the added strength of the heavy steel messenger cable. Conducting Neoprene jackets are highly resistant to tree abrasion, will give long service life, provide ultimate safety and facilitate fault location.

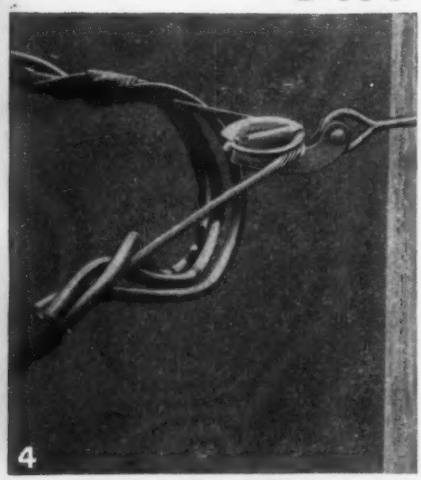
Ask any American Steel & Wire Company representative for details of U·S·S Aerial Cable or write to any of the companies listed below.

American Steel & Wire Company

Cleveland, Chicago & New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL



4. RIGHT ANGLE BEND. Steel messenger is placed around ordinary angle fitting and conductors are bound with heavy marlin. Messenger takes the strain.

Chief Advantages of U·S·S Self-Supporting Aerial Cables

1. Almost complete elimination of cost of tree trimming.
2. Better appearance through elimination of congested overhead lines.
3. Simplicity of design results in lower installation and maintenance costs.
4. Shielded with Amerprene conducting rubber to provide better protection against lightning surges, normal static discharges and ozone.
5. Lower first cost than other types of aerial cables requiring metal tapes or fabric binders.
6. Shorter poles with fewer crossarms and insulators.
7. Easy to tap and splice because conductors are freely accessible and are not bound down by straps or tape.
8. Greater safety, conductors are well insulated and shielded.
9. Abrasion-resisting cover is made of rubber similar to tire treads and is unaffected by sun and weather. It does not fray, check or festoon.
10. Better continuity of service because strong steel messenger protects against sleet, wind and falling trees or limbs.
11. Better voltage regulation on heavily loaded lines because of lower reactance.
12. Radio interference eliminated.

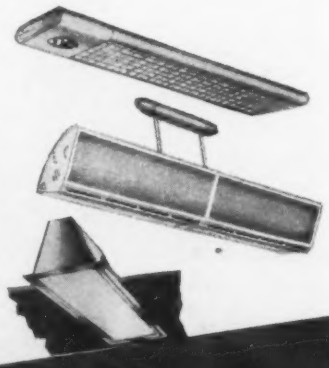
Aerial Cables

AMERICAN STEEL & WIRE COMPANY — USS STEEL — UNITED STATES STEEL

Leader

Leader IUO-240 . . . A typical example of Leader's Controlled Manufacturing. A durable, heavy duty industrial unit. Ideal for continuous runs. Easily installed, eliminates all installation extras.

There's never any "jig-saw puzzle" manufacturing at Leader's three strategically located plants . . . no assembling of misfit parts. With Leader's "under-one-roof" facilities, fabrication, finishing, assembly and inspection follow each other with clock-like precision. This gives assurance that every Leader Fluorescent Luminaire is balanced, with all integral parts perfectly matched for maximum efficiency, simple installation and easy maintenance. For Modern Design, Precision Engineering and Controlled Manufacturing . . . LOOK TO LEADER.



Leader Officer VL-440, with adjustable Direclite . . . Wafer thin. High gloss white enamel louvers for maximum soft light diffusion. Direclite ideal for "spotlight" merchandising, singly or in runs.

Leader Glass Enclosed Unit GL-440 . . . Luxury lighting at moderate cost. Ribbed glass construction plus diffusion louver give pleasing soft lighting effect. Especially fine for stores, offices and schools.

Leader Trofferlite TG-240 . . . Sturdily built to permit ceilings to be hung from the units. With or without glass panels and louvers. Ideal for new construction or remodeling. For use in single units or continuous runs.

Better electrical wholesalers everywhere distribute Leader fixtures. There is a friendly Leader representative in your area.

LEADER ELECTRIC MANUFACTURING CORP.

OLIVER

Now is the time to ... distributor about the complete line of Oliver Pole Line Materials made especially for rural line construction. Long life and satisfactory service are assured by the extensive experience Oliver has had in this field. Some of the major items are illustrated and described on this page.

POLE TOP PINS

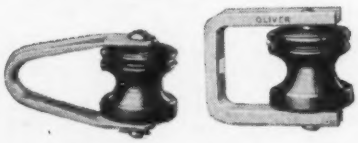
The Oliver line includes all commercial sizes and several designs of galvanized steel pole top pins, including straight and offset types. The pin illustrated is of the pressed steel type.

INSULATOR PINS

Among the various types of Oliver insulator pins is the one-piece design shown here. Square wrench shoulder facilitates lining-up the insulator groove.

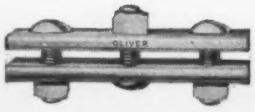
INSULATED CLEVISES

These illustrations show some of the more popular types of Oliver insulated clevises. Made for all styles of construction, Oliver clevises include eye, split, swinging and plain types. Wet or dry porcelain can be furnished. Open-hearth steel is used, hot dip galvanized.



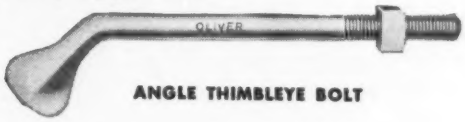
GUY CLAMPS

The straight, smooth, parallel grooves of Oliver guy clamps offer greater clamping area and insure tight connections. These clamps are made in light, medium and heavy types and in lengths from one to four bolts.



BOLTS

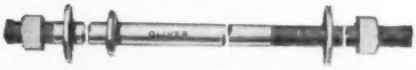
Oliver bolts are made in all styles and sizes required for Pole Line use. Representative types are illustrated below. Oliver bolts are noted for their accurate dimensions, clean threads and accurately tapped nuts.



ANGLE THIMBLEYE BOLT

OVALEYE BOLT

DOUBLE UPSET INSULATOR BOLT



SINGLE UPSET INSULATOR BOLT

POLE LINE MATERIALS

OLIVER
IRON AND STEEL
CORPORATION

...ND

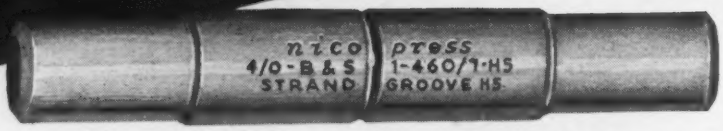
...PA.

Announcing

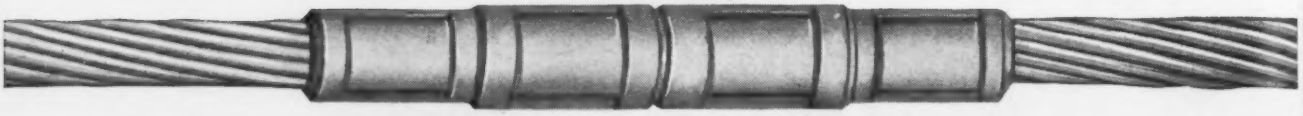
The Nicopress No. 635 HYDRAULIC TOOL and SPLICING

Nicopress SPLICING SLEEVES

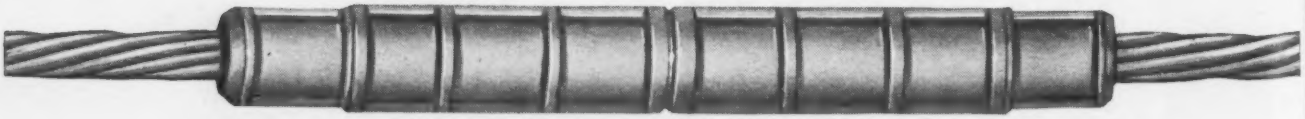
FOR LARGE CONDUCTORS AND HIGH-STRENGTH STRANDS



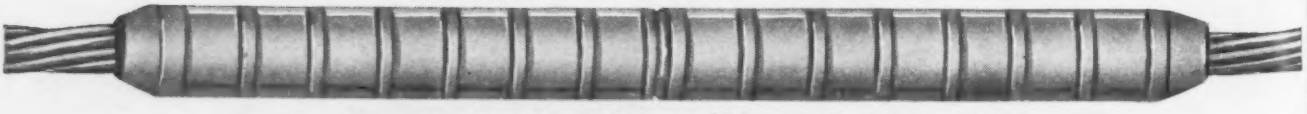
**Light in weight—Holds full strength of conductor—
High in conductivity**



Completed Nicopress Splice on 4/0 Copper Conductor



**Completed Nicopress Splice on 3/8" Extra High Strength
Copperweld Strand**



**Completed Nicopress Splice on 3/8" Extra High Strength
Galvanized Steel Strand**

THE NATIONAL TELEPHONE SUPPLY COMPANY

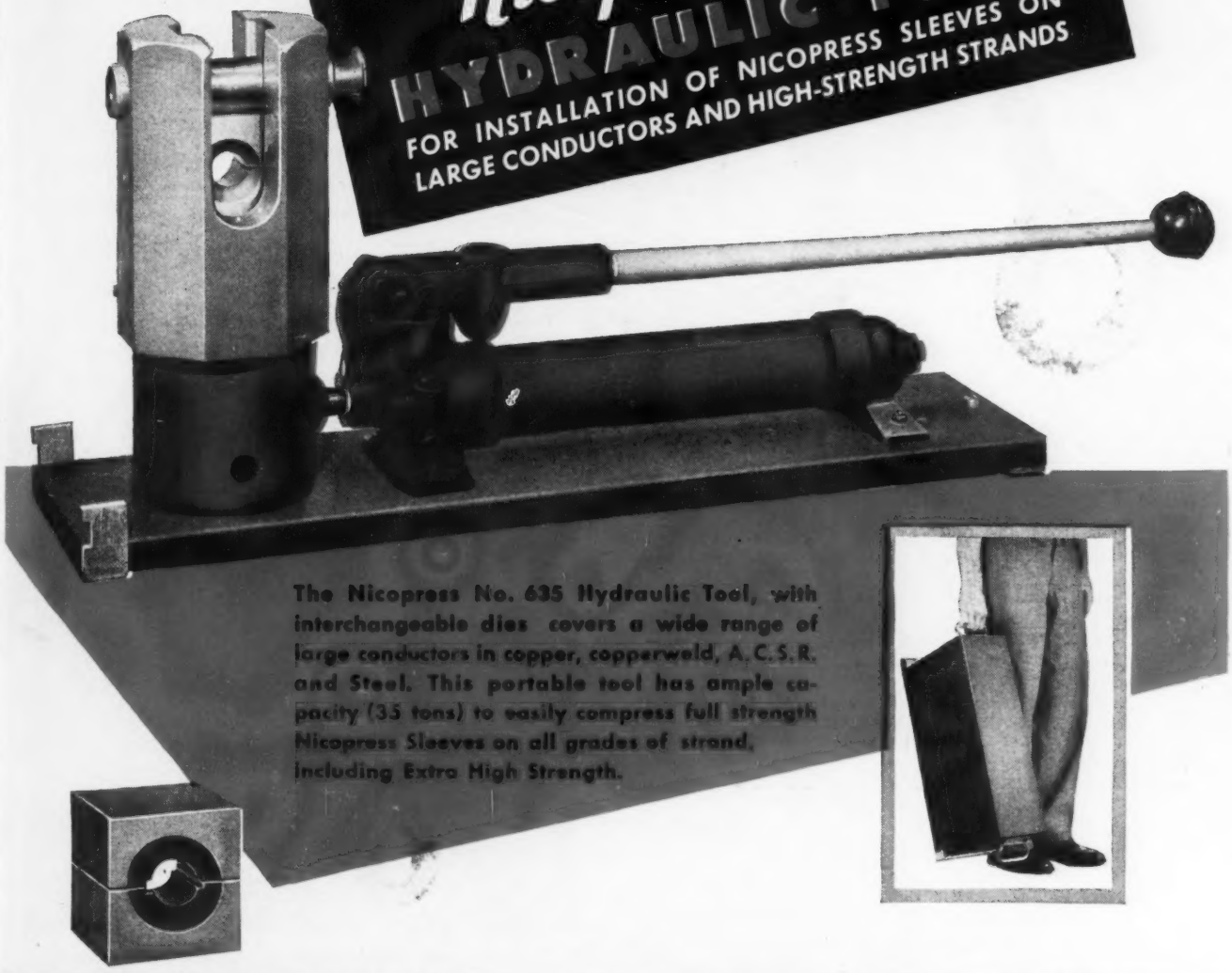
The National

5100 SUPERIOR AVENUE

Canadian Mfr.: N. SLATER CO., LTD., HAMILTON, ONTARIO, CANADA

SLEEVES for LARGE CONDUCTOR & STATIC WIRE Ssplicing

Nicopress No. 635
HYDRAULIC TOOL
FOR INSTALLATION OF NICOPRESS SLEEVES ON LARGE CONDUCTORS AND HIGH-STRENGTH STRANDS



The Nicopress No. 635 Hydraulic Tool, with interchangeable dies covers a wide range of large conductors in copper, copperweld, A.C.S.R. and Steel. This portable tool has ample capacity (35 tons) to easily compress full strength Nicopress Sleeves on all grades of strand, including Extra High Strength.

Telephone Supply Company
CLEVELAND 3, OHIO
Export Distributor: INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N.Y.

FORGED COPPER HOT LINE CLAMP

THE new Reliable hot line clamp is cold forged of pure copper. This means a fine, tough-grained structure of uniform strength. As a result of this method of manufacture you get uniformly high strength with less weight than before. The eye screw is Everdur and cannot be distorted in installation. The standard thread will not vibrate loose, and helps an installer to feel when the clamp is tight. A lug at the base fits all clamp sticks. This clamp is for line wire sizes #1 strand to #6 solid. A split bolt connector makes the tap connection. The clamp is supplied as standard with Reliable #4F connector, which accommodates 2 #4 conductors so leads may be run to both transformer and lightning arrester. For larger taps a larger split bolt connector may be installed up to the #1F size, which accommodates a pair of #1 solid or #2 strand wires or a single tap of #1 strand size.

FORGED COPPER CLAMP
WIRE SIZE

CATALOG NO.	LINE SIDE Max.	LINE SIDE Min.	TAP SIDE Max.	TAP SIDE Min.
328C	1 Str.	6 Sol.	4 Sol.	6 Sol.

PLATED CLAMPS
For Galvanized Steel, ACSR, or Copper Wires

These clamps are electro-tinned, with the exception of the Everdur eye screw.

WIRE SIZE

CATALOG NO.		LINE SIDE Max.	LINE SIDE Min.	TAP SIDE Max.	TAP SIDE Min.
328CP	Forged	2 ACSR Over armor 1 Str. Cu. 4 Str. Steel	8 ACSR 6 Sol. Cu. 8 Str. Steel	6 ACSR 4 Sol. Cu. 6 Str. Steel	8 ACSR 6 Sol. Cu. 8 Str. Steel
596CP	Cast Bronze	2 ACSR Over armor 4/0 Str. Cu.	8 ACSR 6 Sol. Cu.	6 ACSR 4 Sol. Cu. 6 Str. Steel	8 ACSR 6 Sol. Cu. 8 Str. Steel

● Three point contact to line wire. Ring for assistance in holding. Control lug, for engaging with standard clamp stick.

CAST ALUMINUM HEAT TREATED CLAMPS
For ACSR Over Armor Rods or Steel Wires—Copper Tap

The copper tap wire is separated from the aluminum clamp body by a thick bi-metallic aluminum-copper washer, minimizing corrosion

WIRE SIZE

CATALOG NO.	LINE SIDE Max.	LINE SIDE Min.	TAP SIDE Max.	TAP SIDE Min.
596AC	2 ACSR Over Armor	8 ACSR	1 Str. Cu.	6 Sol. Cu.
For ACSR Over Armor Rods or Steel Wires—ACSR or Steel Taps				
596A	2 ACSR Over Armor	8 ACSR	2 ACSR 4 Str. Steel	8 ACSR 8 Str. Steel

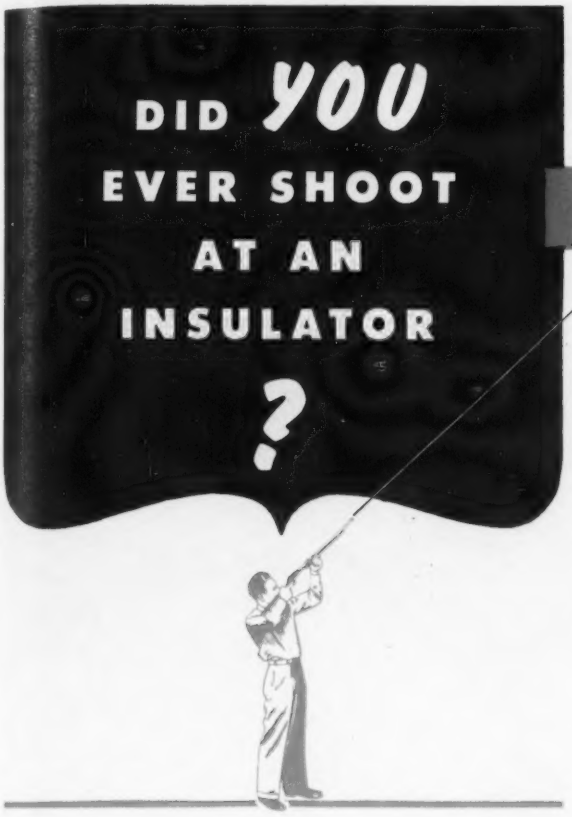
Reliable

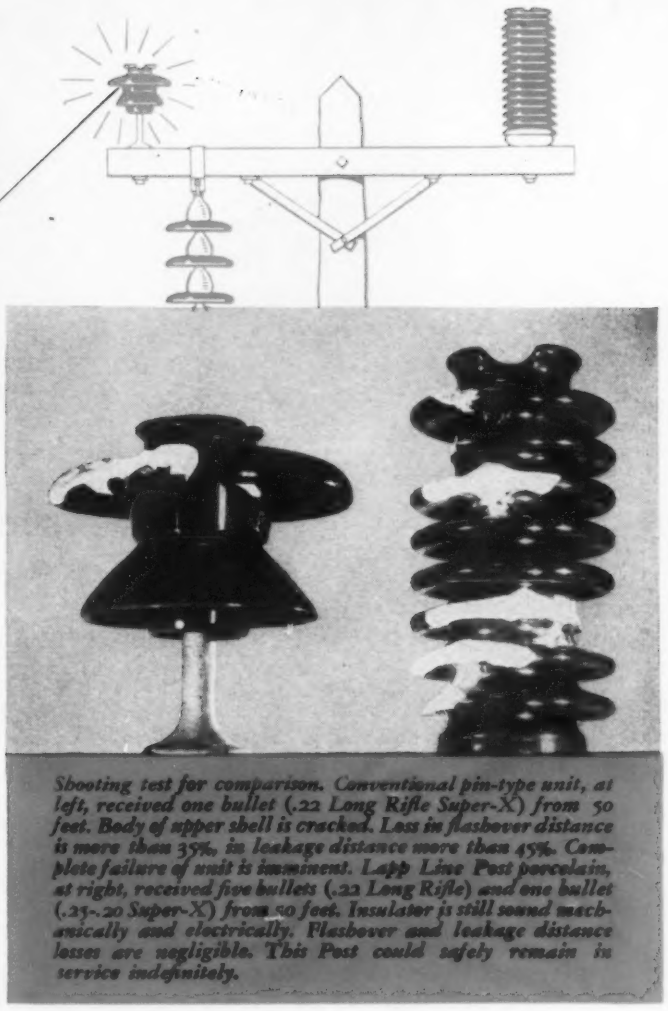
ELECTRIC COMPANY

3145 CARROLL AVENUE CHICAGO 12

OVER 35 YEARS *Service* TO THE UTILITIES

DID YOU EVER SHOOT AT AN INSULATOR ?





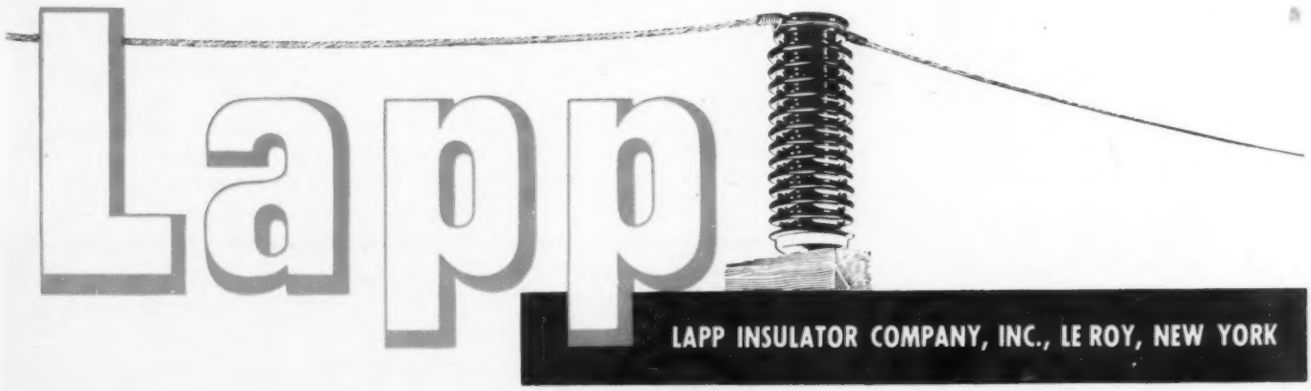
Shooting test for comparison. Conventional pin-type unit, at left, received one bullet (.22 Long Rifle Super-X) from 50 feet. Body of upper shell is cracked. Loss in flashover distance is more than 35%, in leakage distance more than 45%. Complete failure of unit is imminent. Lapp Line Post porcelain, at right, received five bullets (.22 Long Rifle) and one bullet (.25-.20 Super-X) from 50 feet. Insulator is still sound mechanically and electrically. Flashover and leakage distance losses are negligible. This Post could safely remain in service indefinitely.

If the design or operation of high-voltage transmission lines is a responsibility of yours, we'd like to suggest a little rifle practice to you, with high-voltage transmission insulators as your target. All kinds of transmission insulators—as many types and makes as you can lay your hands on. But don't fail to include a Lapp Line Post in your assortment, because it's the comparison of performance under this kind of attack that we want you to know about.

Hunters and kids continue to bang away at insulators on the most remote parts of your lines. It may be money in your company's pocket, and better service to your customers, if you know just what happens when they do.

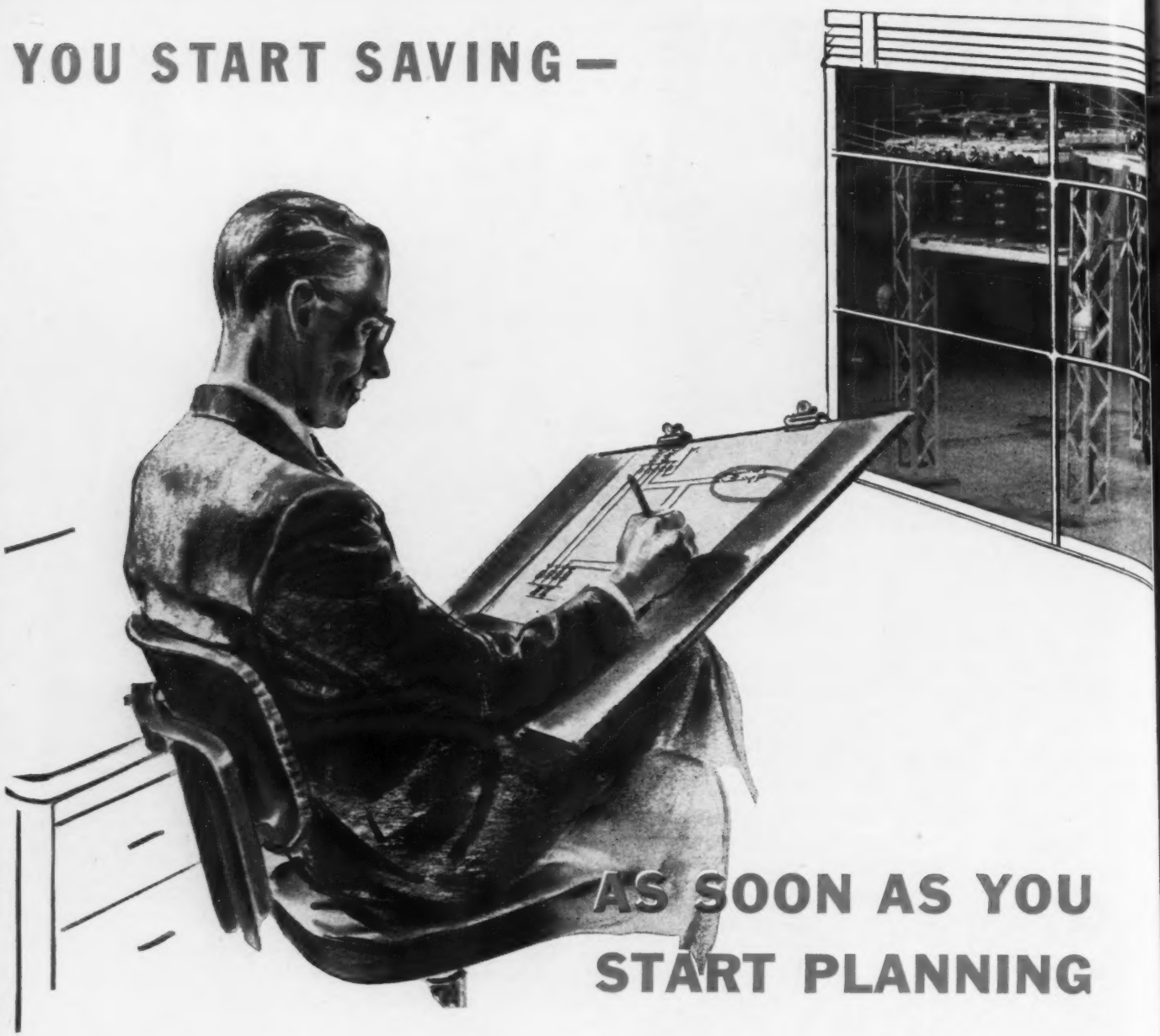
What you'll find is that the broad spreading shells of conventional insulators are particularly fragile under such attack, and having broken away, remove a principal part of the units' flashover and leakage distances. Not only that. In many cases, the fracture will continue, right on through the body of the unit—a probable outage the next time there's rain. On the Line Post, you'll find that the short, sturdy petticoats deflect bullets, or at worst, fracture off, removing only a negligible part of flashover and leakage distances, and leaving the body electrically and mechanically secure.

It isn't even much fun to shoot at Line Posts; you don't get enough action. And there's security to your lines on Line Posts in that fact alone.



LAPP INSULATOR COMPANY, INC., LE ROY, NEW YORK

YOU START SAVING—

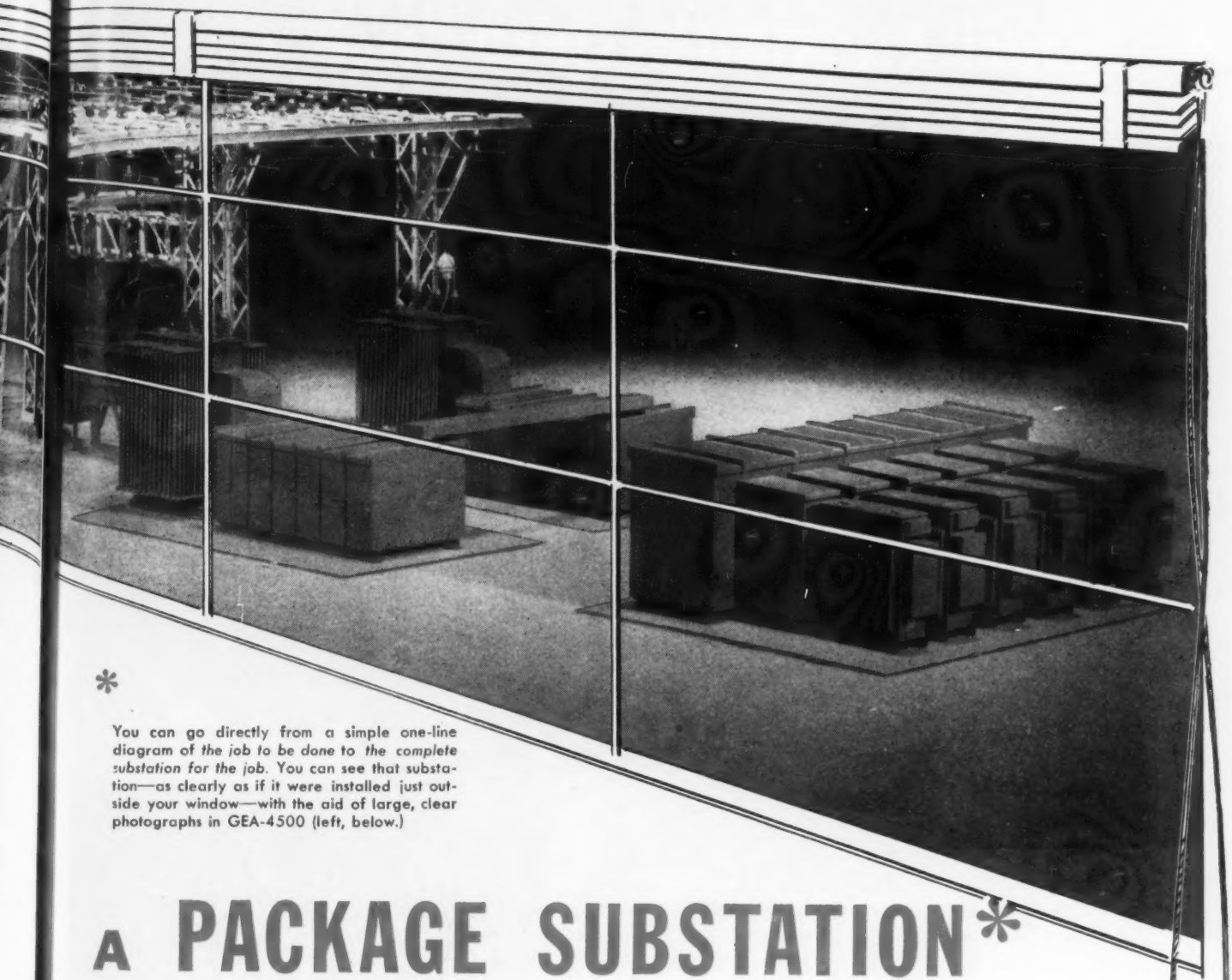


AS SOON AS YOU START PLANNING

Regardless of the size and type of substation you need, you can now cut out costly months of detailed planning by going directly from *the job to be done* to *the complete substation for the job.*

This is made possible by General Electric's new *package substation*, which gives you—as a unit—a complete, co-ordinated package including one or more master unit substations, steel structure and *all* other electric equipment to match your exact needs. It extends the vital "buy it complete" trend throughout ratings from 750 to 45,000 kva; 11 to 69 kv, incoming, and 2.4 to 13.2 kv, outgoing.

You have hundreds of package substation combinations from which to select. The one to match your next specific application is likely shown in GEA-4500 (left). This helpful, 78-page bulletin describes 30 standard classes of package substations, gives you helpful application information on each,



*

You can go directly from a simple one-line diagram of *the job to be done* to *the complete substation for the job*. You can see that substation—as clearly as if it were installed just outside your window—with the aid of large, clear photographs in GEA-4500 (left, below.)

A PACKAGE SUBSTATION*

and shows you just how each will look installed. From these—and the hundreds of standard modifications—it's easy to select a package substation having the exact ratings, functions, circuits and physical arrangement for your job.

Whether your substation is to be small or large, simple or complex, you need prepare but *one specification*, place but *one order*.

Your General Electric sales representative can provide a copy of GEA-4500, and will gladly work with you on any substation application you have in mind. *Apparatus Dept., General Electric Company, Schenectady, N. Y.*

. . . and your savings continue for years

Installation is easy and economical Your package substation arrives in factory-assembled sections as large as shipping and handling facilities permit. It includes everything you need—right down to complete erection instructions. You can put the complete substation on the job quickly, easily, and economically.

You get a valuable flexibility for future needs Centralized design of G-E package substations permits exceptional flexibility to meet changing load requirements. Capacity can be added—or removed—in easily handled "blocks of power," to take care of increased load requirements, load shifts or relocations. You avoid costly modification of installed equipment, achieve a more economical use of your installed capacity.

Full co-ordination of all parts gives you a better, more dependable substation The package substation you order passes from the drawing board through the factory as a **unit**, receiving centralized supervision of the over-all design and assembly. The result is full co-ordination—mechanically, electrically, and thermally—that pays off in years of increased dependability and reduced maintenance.

GENERAL ELECTRIC

321-53-5900

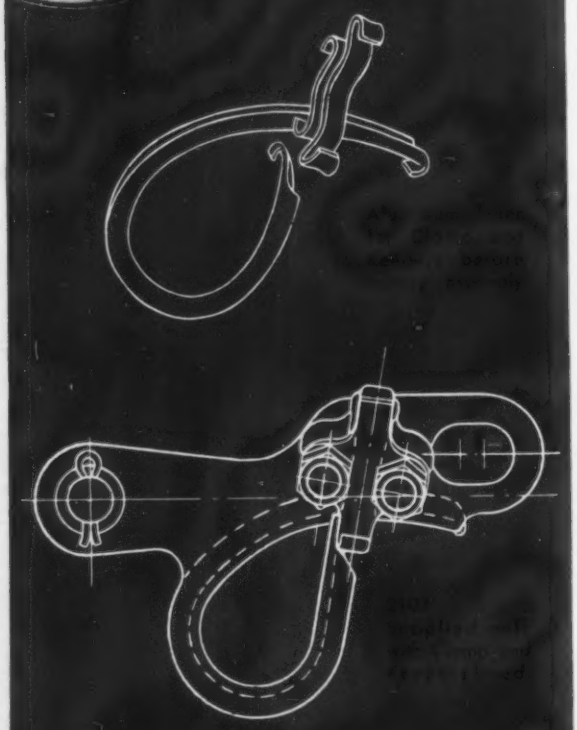
Special ALUMINUM-LINED Strain Clamp for A.C.S.R. Conductors

Expensive use of field-applied armor tape for A.C.S.R. Conductors is no longer necessary with the new BTC No. 2107 Strain Clamp. Body and keeper of this Clamp are supplied only lined with soft aluminum sheet which replaces the need for armor tape.

Design of the Clamp is the Snail-Shell Snubbing Type, but the body is one-piece pressed from heavy gauge steel. In every respect this BTC Strain Clamp No. 2107 is made for lasting service—damage to conductor is prevented by large snubbing radii, U-shaped conductor seat and long clamping section. Effects of conductor vibration are minimized by light weight and large cable seat radius of 6" at Clamp mouth.

Offered for use *only* on A.C.S.R. Conductors within size range of Min. 0.158" to Max. 0.398". Approved by R.E.A. and the Aluminum Company.

Installation of BTC Strain Clamp No. 2107 is particularly simple besides saving the cost and field application of armor tape. Write for advance information about use of this Clamp for A.C.S.R. Conductors on rural and distribution lines.



Sold only through your insulator manufacturer

THE BREWER-TITCHENER CORPORATION

CORTLAND, N. Y.

He gets the FATTEST envelope

YOUR PAYMASTER never sees him . . . he never signs the payroll . . . but Inadequate Wiring, the industrial jinx, draws big money.

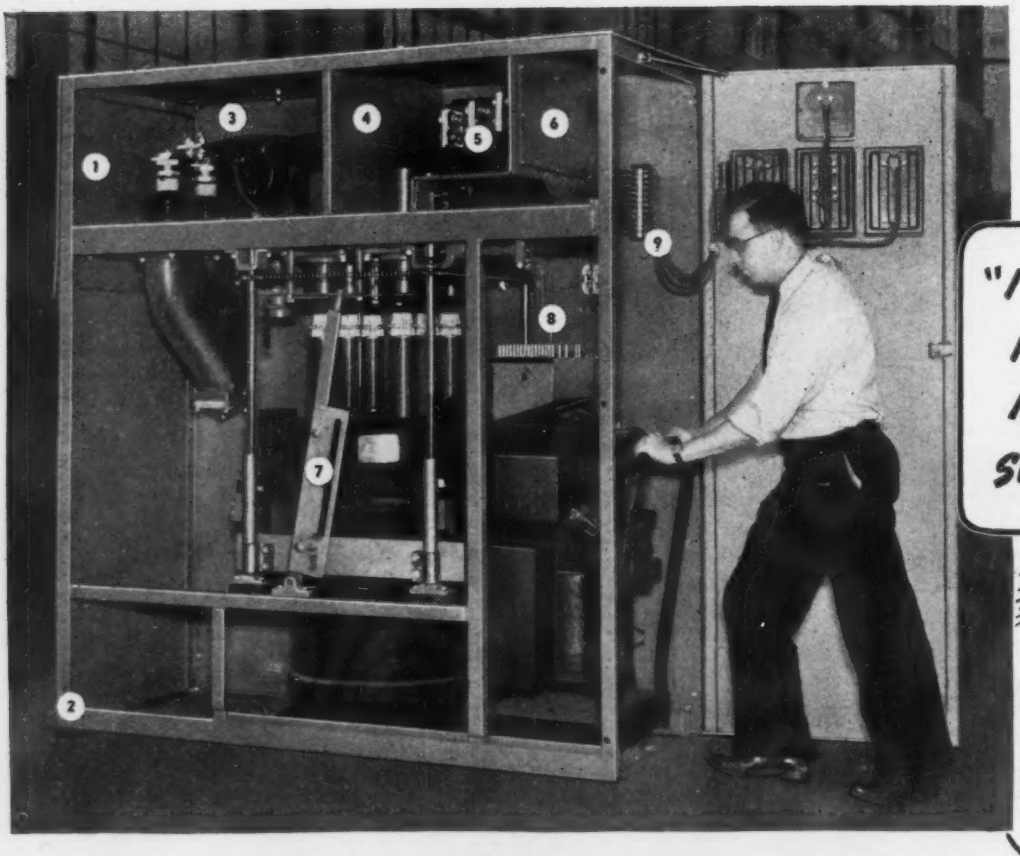
Week in and week out, overtaxed, overextended, obsolete wiring can tax plant efficiency 25 to 50 percent without detection until a major tie-up occurs.*

To remove this costly imposter from your payroll, call in your plant power engineer, your consulting engineer, electrical contractor or utility power salesman. These men can find his finger prints anywhere in the plant. 47635

*WIRE AHEAD, a new booklet discussing preventive maintenance . . . the symptoms of inadequate wiring . . . and presenting plans for anticipating electrical demand, is now in preparation. We shall be glad to send it on request as soon as it is available.

ANACONDA from mine to consumer

ANACONDA WIRE AND CABLE COMPANY



Operators Who Have This Switchgear Like It! Here are 9 Good Reasons Why:

ASK A MAN who has modern Allis-Chalmers switchgear in his plant why he likes it, and chances are that he will give not one, but several of these reasons:

1. Switchgear units are factory-built, wired and assembled. **2.** It's simple to install units, because alignment is needed at just 4 points—not 8! **3.** Changing load is easy—compartments can take current transformers of any size without rebuilding. **4.** Tightly fitted steel barriers separate compartments for buses, instrument transformers, circuit breakers, secondary wiring. For safety, units are isolated from each other!

5. Special method of insulating busbars does away with using compound filling for bus joints. **6.** Removable plates allow easy access to bus and instrument transformer compartments, circuit breakers and secondary wiring. **7.** *Fully automatic* shutters open and close orifices of primary disconnects, when breaker is removed or inserted. **8.** Elevating mechanism has *positive interlocks* which trip circuit breaker if it is in closed position when raised or lowered. **9.** "Hinged" wiring connection between door and stationary element eliminates wear or bending on wires when door is opened and closed.

Get other details about Allis-Chalmers metal-clad, vertical lift switchgear by calling our nearby sales office, or write ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2075

"IT HELPS me in selecting equipment to keep in mind the main advantages I'm looking for. With switchgear, my requirements boil down to three points . . .

"FIRST, I want *safety,* for my operators and my equipment. Allis-Chalmers' totally-enclosed switchgear gives me all the safeguards I require . . . including automatic disconnect shutters and positive interlocks.

"NEXT, I want *simple installation.* With Allis-Chalmers switchgear, there are only four *points* to be lined up. I've found these standard, factory-wired units are simpler, quicker to set up in the plant.

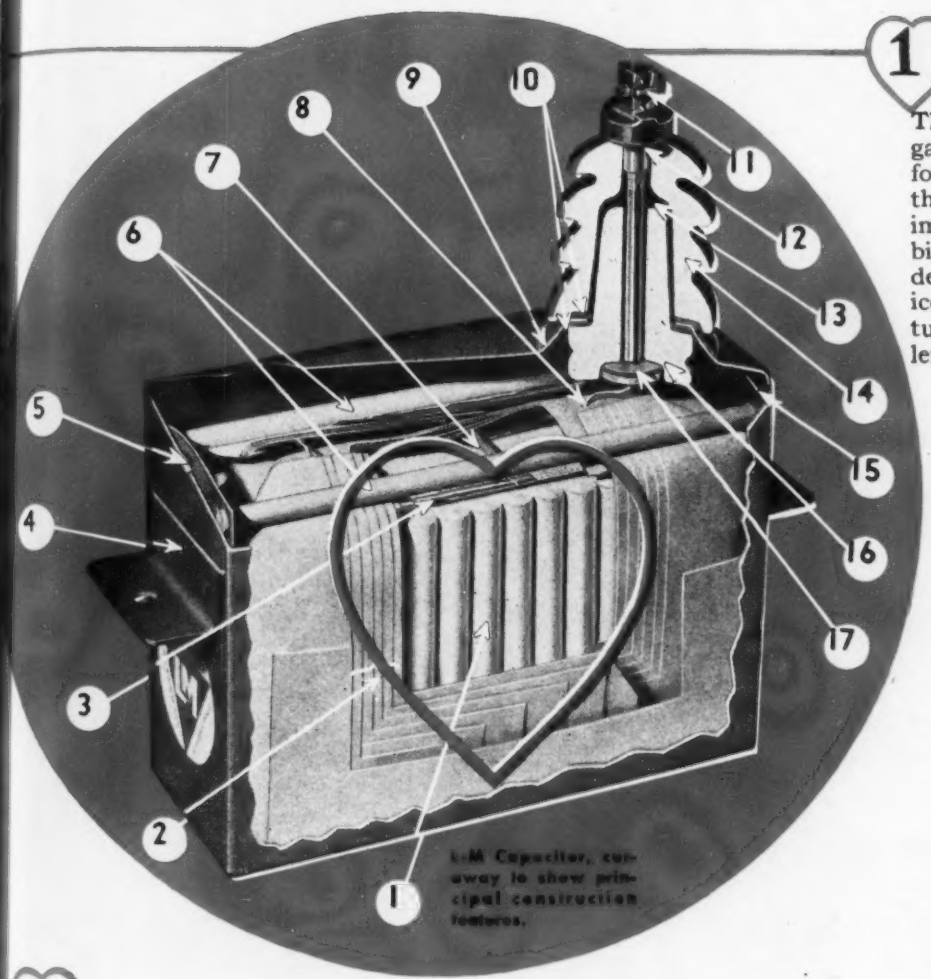
"FINALLY, I want *easy maintenance* of breakers and stationary elements. A-C's switchgear scores here, too. It suits me because it offers *all three* of the advantages that mean most to a switchgear operator!"

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

METAL-CLAD *Switchgear*

The Life of a Capacitor Depends on its "HEART"



L-M Capacitor, cut-away to show principal construction features.

How a strong HEART is built into every Line Material Distribution Capacitor

The ratio between operating voltage applied to the foil plates and total thickness of insulating tissue separating these plates reveals a relatively low unit stress.

Thus the insulation is not worked so hard, with consequent reduction in heating per unit volume. Such design characteristics in the L-M Capacitor assure the most economical, trouble-free service.

L-M Capacitor packs are wound in air that is clean and closely controlled as to temperature and humidity. Each assembled capacitor is dried under high vacuum and impregnated with "Elemex" insulating liquid by L-M's exclusive "capillary impregnation" method. Each unit is treated separately, and is constantly tested for electrical efficiency. Each must meet high and rigid standards.

1 The "heart" of a capacitor is the aggregate of its packs. The quality of metal foil, insulating tissue, and impregnant, the care and conditions of winding and impregnation . . . these factors, combined with conservative unit stress, determine the length of life and serviceability of the capacitor. This feature of L-M Capacitors is described at left below diagram.

Other L-M Capacitor Features:

2 *Major Insulation;* a multiple cover of top grade Kraft paper.

3 *Wire* for connecting packs in series-parallel arrangement.

4 *Finish;* 3 coats alkyd resin type paint, oven baked; highly durable.

5 *Seal-off Hole,* with copper plug soldered in.

6 *Dowels* (two); prevent shifting of packs within tank.

7 *Discharge Resistor;* for safety in handling Capacitor; drains off charge to potential of 50 v. or less within 5 minutes.

8 *Leader* from pack to bushing.

9 *Rain Shed;* assists in maintaining moisture-proof seal.

10 *Gaskets* above and below rain shed, of cemented resin bonded cork.

11 *Terminal;* advanced clamp design; will take at least two conductors; parts cannot fall off during connection.

12 *Outer Bushing Gasket.*

13 *Bushing Sealer;* entire space between inner and outer porcelain filled with compound, which increases internal flashover value and eliminates corona.

14 *Outer Porcelain* (wet process).

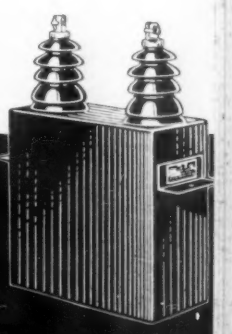
15 *Metal End Plates;* anchor the dowels and packs.

16 *Inner Porcelain* (wet process).

17 *Inside Bushing Gasket.*

SIZES AND STANDARDS. These capacitors meet all AIEE-NEMA standards for outdoor capacitors with respect to voltage rating, kva, losses, bushing flashover, over-voltage test, insulation strength, radio noise, heating and discharge resistors.

L-M Distribution Capacitors are now produced in sizes 15 KVA, 2400 to 13,800 volts, and 10 KVA, 2400 and 4160 volts. For further information write to Line Material Company, Milwaukee 1, Wisconsin.



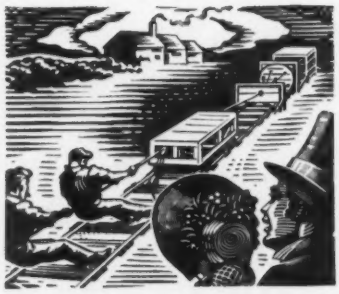
LINE MATERIAL
CAPACITORS

L-M DISTRIBUTION EQUIPMENT INCLUDES: Distribution Transformers • Fuse Cutouts and Fuse Links • Lightning Arresters • Oil Switches • Pole Line Hardware • Line Construction Specialties • Underground Equipment • Fibre Conduit • Street and Airport Lighting Equipment • Wired Radio Control Equipment • Capacitors

CONFIDENCE.

Manufacturers of Wire Rope and Strand • Fittings • Slings • Screen, Hardware and Industrial Wire Cloth • Aerial Wire Rope Systems
Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Ski Lifts

. . . . how much is it worth?



IN 1841, two years before the first telegraph line was installed in this country, and when there were but 27 states in the Union, John August Roebling was inspired with the idea of making a new kind of rope of unheard of strength and flexibility. His confidence in his idea caused him to risk everything he had on the development of his new rope.

How much is his confidence worth to Industry today, which couldn't turn a wheel without the modern wire rope?

Today, the John A. Roebling's Sons Company invests much time, effort and money in the development of improved products to keep alive the confidence of its many customers.

Roebling values this confidence as its greatest asset. That's why it offers you the greatest value for every dollar you invest . . . in *any* Roebling product.

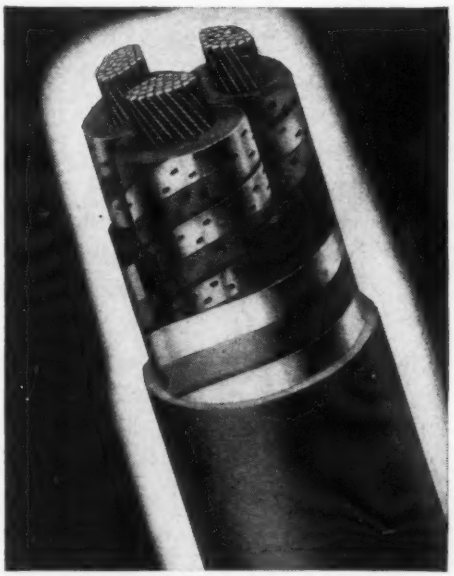
FOR PERFORMANCE—UTILITY ENGINEERS TURN WITH CONFIDENCE TO ROEBLING PAPER INSULATED CABLES

AS WITH any product, the final test of Roebling Paper Insulated Cables is performance. But the confidence with which utility engineers specify Roebling cables means their performance can be predicted—in advance.

A typical example is Roebling Paper Insulated Cable (Shielded Type H) for underground power transmission. It's made of the finest available materials . . . in single or multiple conductors . . . in a wide range of sizes . . . in standard or special constructions. It's soundly designed and engineered. It is the best Roebling knows how to make.

And not only the cable commands your confidence. At Roebling, product and service go hand in hand. Experienced engineering service will help you get *all* the dependability and long life you pay for. Just call our nearest branch office and talk to your Roebling Field Engineer.

JOHN A. ROEBLING'S SONS COMPANY
OF CALIFORNIA
San Francisco • Los Angeles • Seattle • Portland

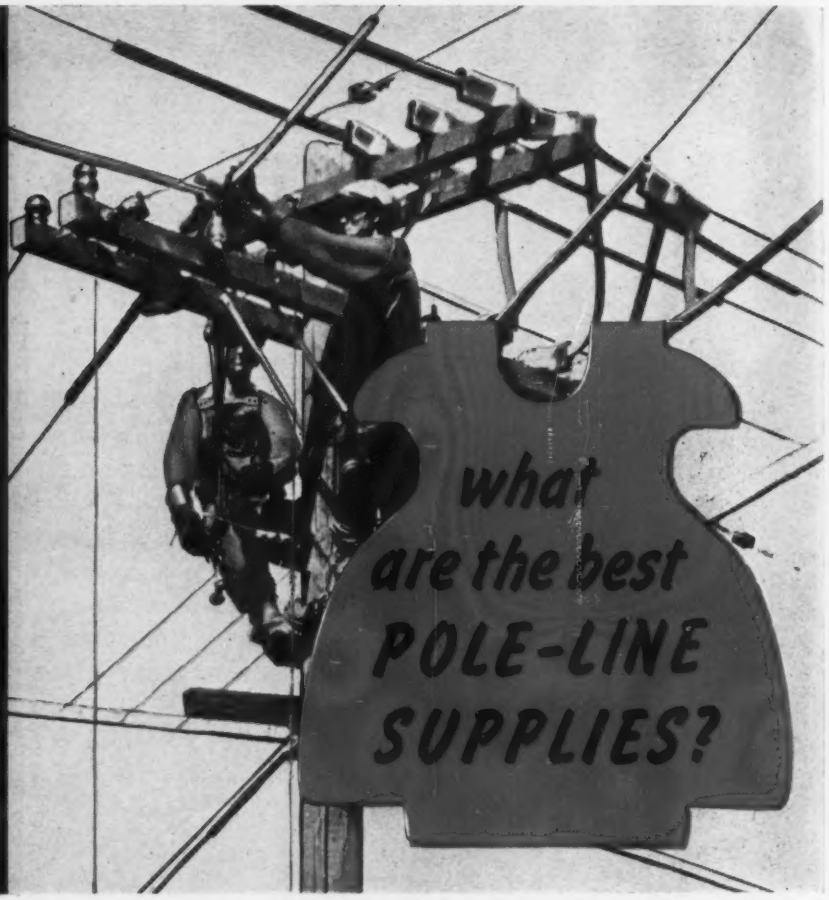


Electrical Wire and Cable • Suspension Bridges and Cables
Aircord, Aircord Terminals and Air Controls • Lawn Mowers

ROEBLING

A CENTURY OF CONFIDENCE

For that distribution line you're planning...



GraybaR can help you get the best combination

How many different pole-line items do you use? How many manufacturers of pole-line supplies can you think of? If you put the two lists side by side, you'll realize how many *different combinations* of pole-line items you have to choose from.

Through many years' experience in distributing carefully selected makes of pole-line supplies, Graybar Outside Construction Specialists have become expert in helping power men choose the *best combinations* of items for individual projects.

Our nation-wide warehousing system makes it possible for you to obtain all your pole-line supplies through a single, local contact. Although our stocks aren't complete today, we can deliver many items immediately.

Your near-by Graybar Representative will welcome a chance to demonstrate why Graybar is a desirable source of pole-line supplies for your requirements. *Graybar Electric Company. Executive offices: Graybar Building, New York 17, N. Y.*

Want your order filled by our stockholders?

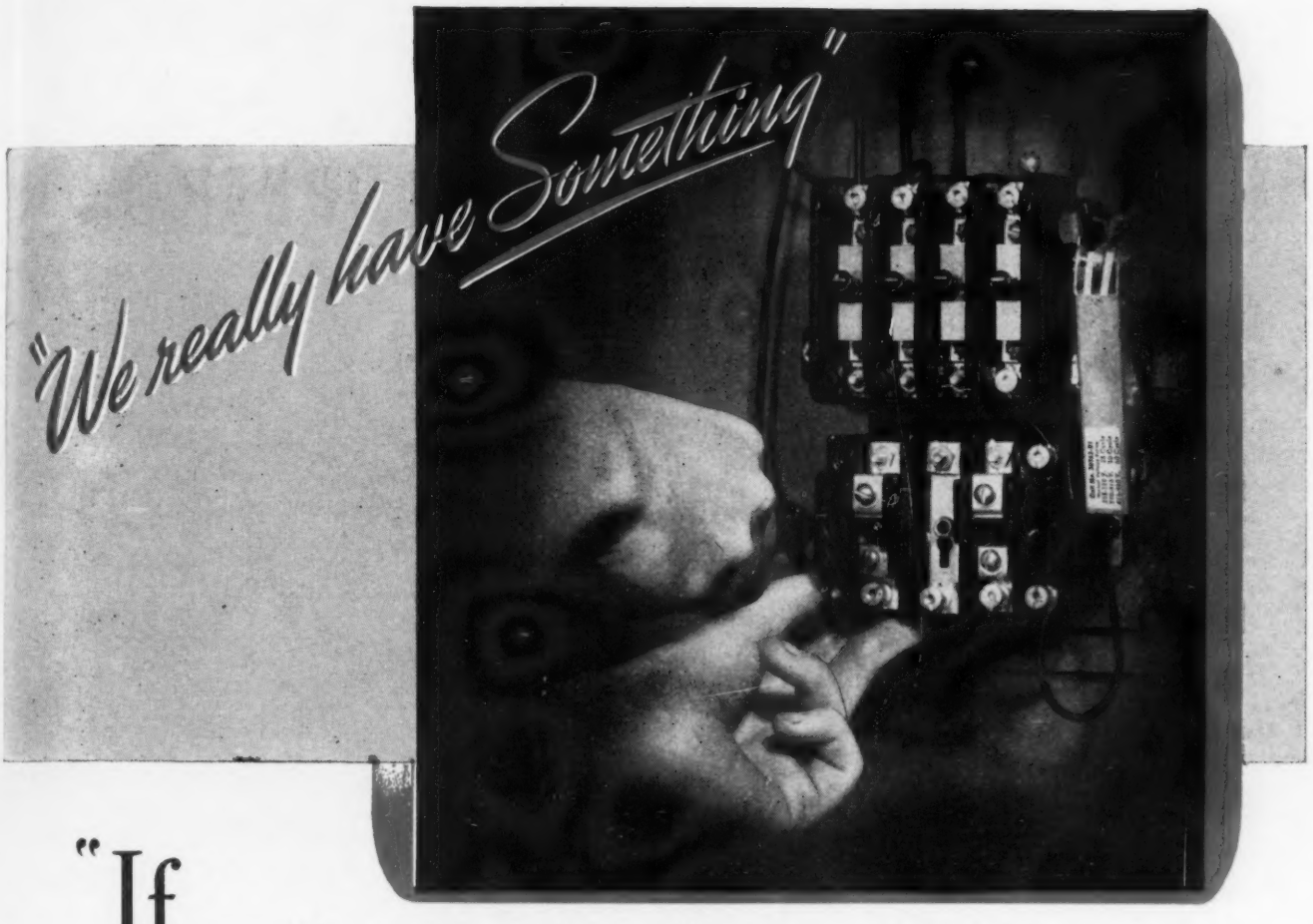
Whenever you order anything electrical from Graybar, your requirements *do* receive the personal attention of our stockholders. Graybar is wholly owned by its operating personnel. That's one reason why Graybar people —together forming a huge, nation-wide organization — apply to each job the sense of personal responsibility you associate with a small, well run, *local* business.

4715

Everything for your Pole Lines via GraybaR

IN OVER 90 PRINCIPAL CITIES

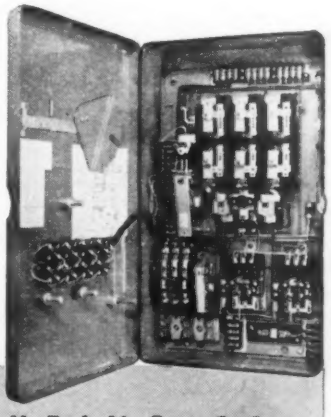
POLES • CROSSARMS • STRAND • INSULATORS • HARDWARE • PROTECTIVE DEVICES • LINE TRUCKS • CONNECTORS • TOOLS



"If you could come with me to the special assembly division at Plainville, you'd see what I mean. The day we took these pictures, for example, there was a multi-motor controller for a famous machine tool manufacturer, individual plug-in type control center units for a large oil refinery, the complicated fully automatic 'electric brain' for a paper making machine — all being manufactured on a standard production basis — *specials* in every sense of the word — but made from tried and proved Trumbull Electric basic components. Such basic components mean to you, as the customer, special controls with *standard* Trumbull performance.

"Standard design elements in the tremendously varied Trumbull production range make it possible for our customers' design engineers to specify special controls without running into a stone wall of excessive *special costs.*

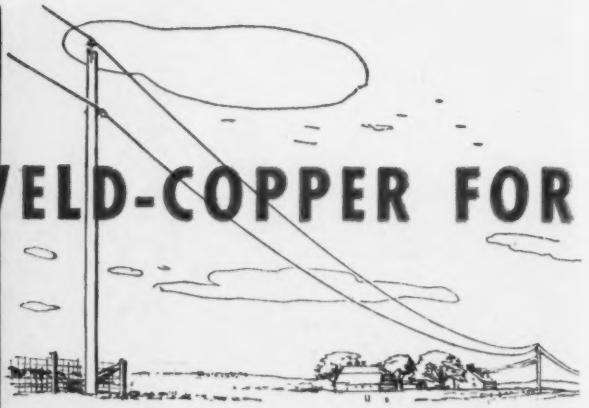
"Of course, we of Trumbull can only try to give you a quick picture of a mighty good proposition in these few words. If you have a problem that indicates modern electrical control, it will be well worth your while to write now or come to our Plant and see for yourself. Trumbull engineers are good people to talk to — and work with."



TRUMBULL (T) ELECTRIC

MOTOR CONTROL

THE TRUMBULL ELECTRIC MANUFACTURING CO.
PLAINVILLE, CONNECTICUT
OTHER FACTORIES AT NORWOOD, OHIO • LOS ANGELES • SAN FRANCISCO • SEATTLE



ELD-COPPER FOR

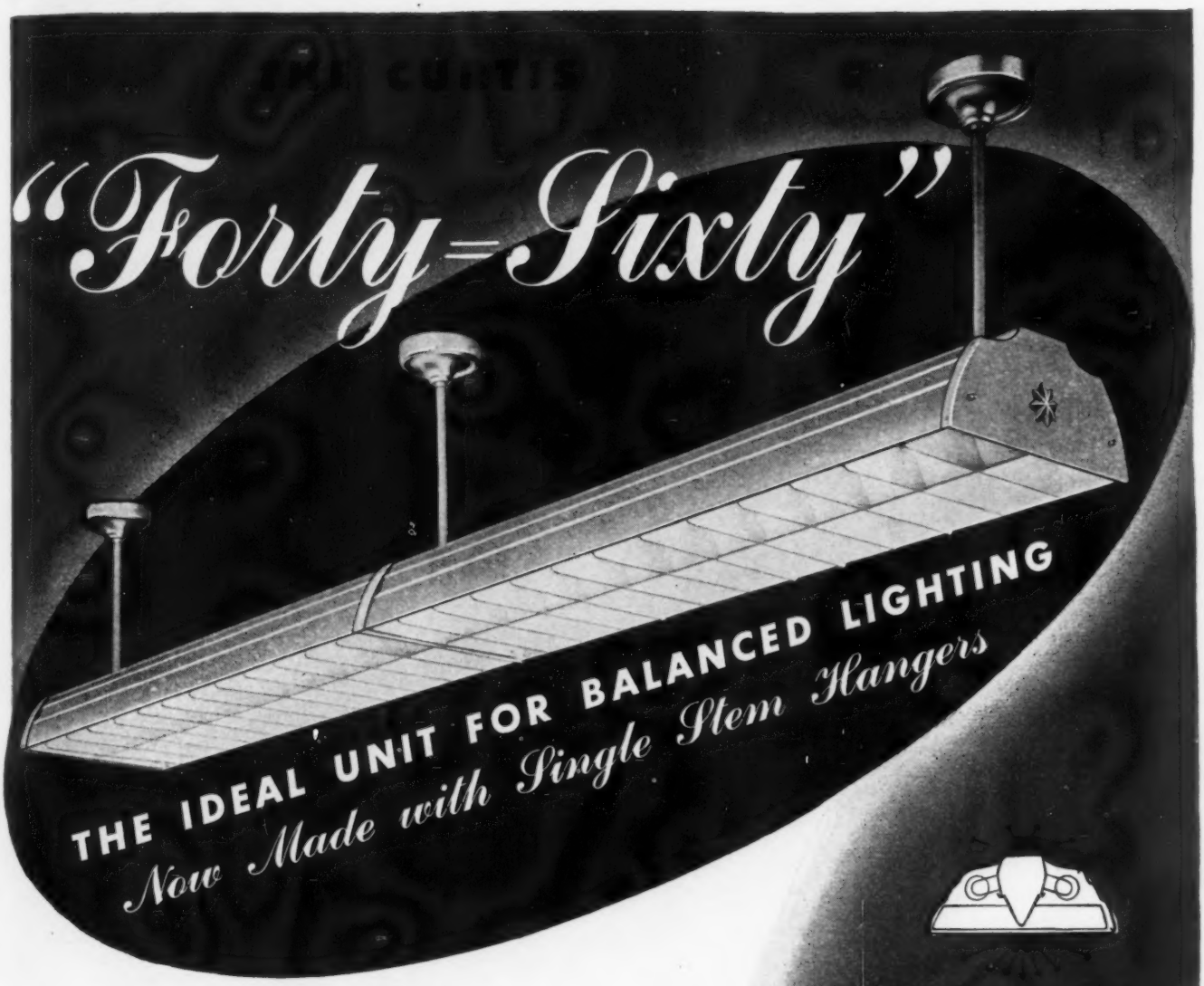
The unusually high strength of 8D Copperweld-Copper conductors permits the construction of rural lines with longer and safer spans, thus effecting great savings in poles and accessories. Besides enabling lower construction costs, they are extremely economical for year-after-year service.

8D consists of two Extra High Strength Copperweld wires and one copper wire, stranded together to make a rugged conductor of triangular design which minimizes vibration. Electrolytic corrosion is impossible because of the copper-to-copper contacts . . . hence the strength which permits longer spans and heavy ice and wind loads is permanent.

All of these advantages make 8D Copperweld-Copper the best conductor for rural lines where No. 8 conductivity is required. Complete information and engineering assistance are yours for the asking . . . without any obligation.

COPPERWELD STEEL COMPANY
Glassport, Pa.
SALES OFFICES IN PRINCIPAL CITIES
Pacific Coast Office: Rialto Building, San Francisco, Calif.

COPPERWELD
—made by molten-welding a thick, protective copper covering to an alloy steel core—combines high conductivity and rust-resistance with long-lasting, high tensile strength.

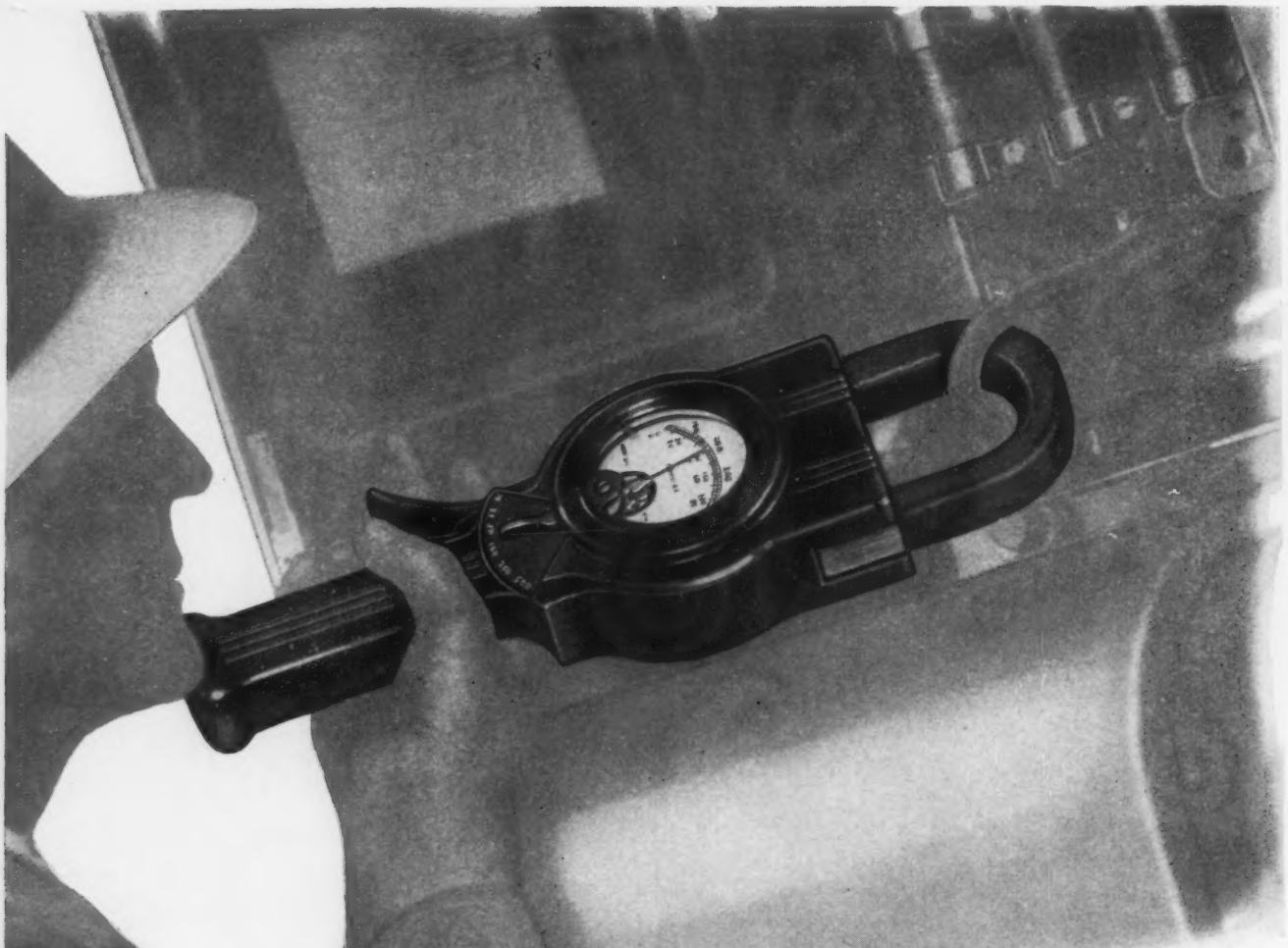


Balanced lighting, producing efficient "seeing" conditions for the human eye is the keynote of more and more lighting specifications . . . today's demands are for ample light on the working surface *plus* sufficient room illumination with low brightness contrasts. That's the job the Curtis Forty-Sixty is designed to do—forty percent of its output is directed toward the ceiling where it is evenly diffused into the room . . . sixty percent is directed downward to the working surface . . . thus, comfortable efficient lighting is achieved for schoolroom, office or drafting room.

An Alzak Aluminum Unit, the Forty-Sixty is easy to keep clean because there are no horizontal surfaces to collect dust. Scientifically designed louvering shields the lamps from all ordinary angles of view.

The Forty-Sixty is now available with either single or double stem hangers for installation in continuous runs or as individual units. Get complete data on the Forty-Sixty . . . write for it today.

CURTIS Lighting INC.
6135 WEST 65th STREET
CHICAGO 38 • ILLINOIS



Time Saver...Trouble Saver

for electrical maintenance

WESTON AC CLAMP-AMMETERS

A time saver for either routine checks or trouble shooting. The jaws are simply hooked around the conductor and reading made without interrupting circuits or disrupting work. Three types available . . . top ranges of 500, 1000, or 2000 amperes. For further information see your local WESTON representative, or write . . . Weston Electrical Instrument Corporation, 577 Frelinghuysen Avenue, Newark 5, New Jersey.

Weston *Instruments*

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NEW ORLEANS • NEW YORK • PHILADELPHIA • PHOENIX • PITTSBURGH • ROCHESTER • SAN FRANCISCO • SEATTLE • ST. LOUIS • SYRACUSE • IN CANADA, NORTHERN ELECTRIC CO., LTD., POWERLITE DEVICES, LTD.

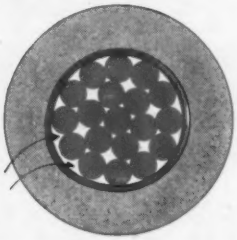
Developed through Okonite Research . . .

SEMICON TAPE

. . . PREVENTS INTERNAL CORONA CUTTING IN HIGH VOLTAGE CABLES

ADVANTAGES OF USING SEMICON TAPE

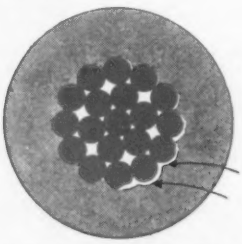
(Conductors Shown in Color)



AIR POCKETS EXCLUDED FROM DIELECTRIC FIELD

WITH SEMICON

1. Uniform stress conditions result from smooth, cylindrical conducting surface
2. No voids develop because Semicon tape and insulation are vulcanized together
3. No internal corona cutting can occur since the voids which cause it are eliminated



AIR POCKETS IN DIELECTRIC FIELD

WITHOUT SEMICON

1. Points of high stress exist because of irregular conductor surface
2. Voids, gaps or "pockets" can develop because cable movements may distort insulation
3. Voids under stress result in ionization (internal corona cutting)

Longer cable life through greater built-in protection — that's what users of high voltage cables are assured by the Semicon tape now an integral part of every rubber insulated cable made by Okonite for operation at voltages above 2000 between phases.

Semicon tape is a strong cotton fabric impregnated and coated on both sides with a semi-conducting neoprene compound developed in the Okonite laboratories. It is applied between the Okoloy-coated conductor and the rubber insulation, being wrapped helically around the conductor with sufficient lap to insure complete coverage. It is bonded to the inner surface of the insulation during vulcanization so that no voids or spaces are present in which corona cutting of the inner surface of the insulation might start.

Comparative cross-section views at left show at a glance the advantages of Semicon tape . . . the absence of voids or air pockets next to the insulation at the conductor surface where the electrical stress is high.

Even under the most severe test conditions, no failure caused by internal corona cutting has ever developed in a cable made with Semicon tape, first used in Okonite-engineered cable in 1938. Furthermore, Semicon tape has considerably raised voltage test values. As a result, factory a-c high voltage tests have been increased by 25 percent, a standard Okonite precaution that provides additional insurance against the possibility of insulation defects.

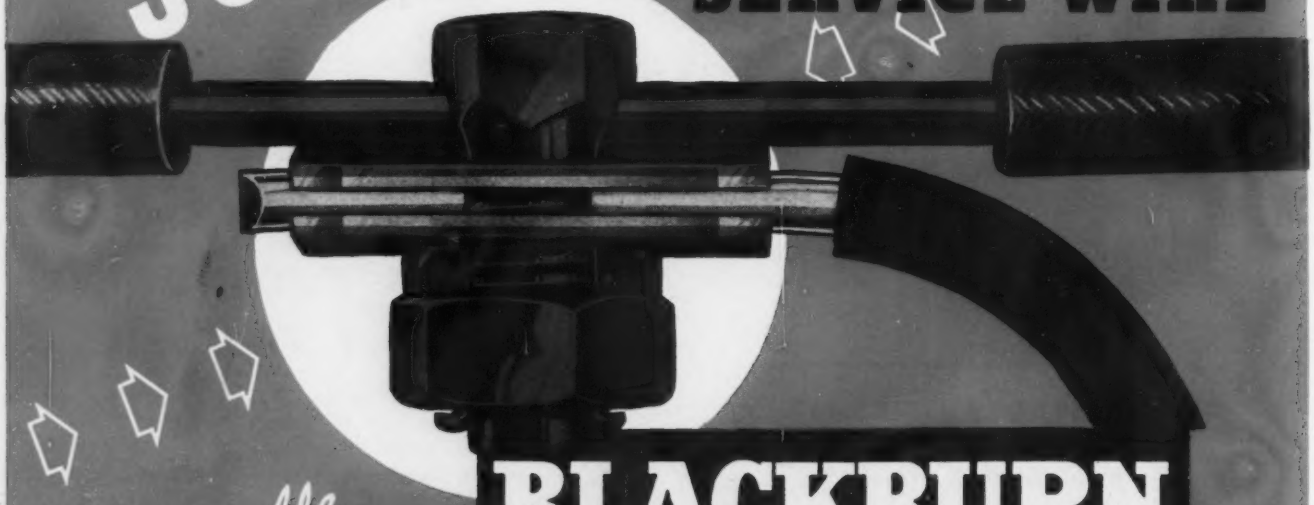
For further information on Semicon tape and the high voltage cables in which it is used, get in touch with Okonite engineers. The Okonite Company, Passaic, N. J.

OKONITE

insulated wires and cables

FOR THE NEW

SOLID ALUMINUM SERVICE WIRE



Available for Prompt Delivery!

BLACKBURN *Hi-Strength* CONNECTORS

HOW TO ORDER:

See your Local Jobber and Specify these Catalog Numbers:

Max. Copper Line Wire	Max. Alum. Tap Wire	Blackburn Catalog No
6 Solid	6 Solid	6H-3-W
4 Solid	4 "	4H-3-W
2 Solid	2 "	2H-W
2 Stranded	2 "	1H-W
1/o "	2 "	1/oH-W
2/o "	2 "	2/oH-W
4/o "	2 "	4/oH-W

OVER 100 CONVENIENTLY-LOCATED JOBBERS

These New Connectors are Better Because:

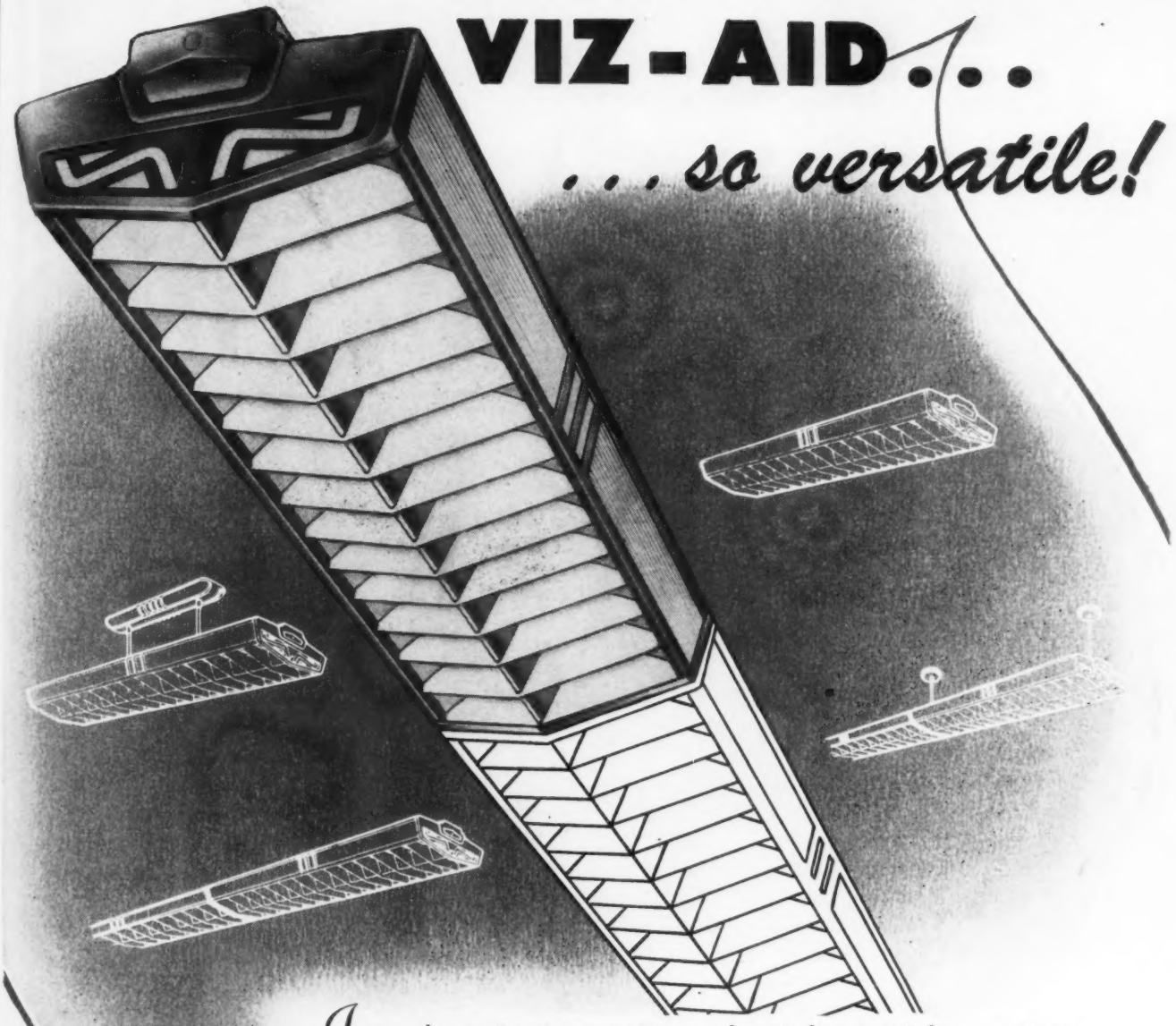
1. Aluminum tap is encased between two aluminum-copper, bi-metallic, grooved washers *to prevent electrolysis.*
2. Connectors are designed for use at both the line end and the house end of the aluminum service wires.
3. Connectors can be re-used if the aluminum service wire is ever replaced with a copper wire, by merely removing the two bi-metallic washers.
4. Connectors are made of high strength DURONZE—hence are more durable and last longer.
5. They are truly Hi-Strength Connectors and can be installed very tightly without distorting—hence a more efficient connection.

FIRST, MADISON & CLINTON STS. • **JASPER BLACKBURN PRODUCTS CORP.** • ST. LOUIS 6, MISSOURI

BUILDERS OF QUALITY CONNECTORS FOR OVER 10 YEARS

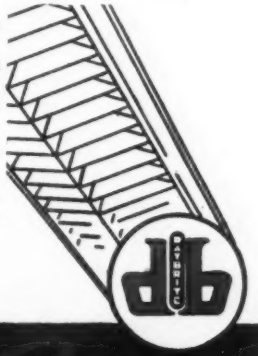
VIZ-AID...

...so versatile!



Its chassis is equipped with a wide variety of installation aids: holes, slots, knockouts . . . so you can mount it anywhere and anyway.

Viz-Aid commercial fixtures... for two 40- or two 100-watt lamps. U. S. Patent Nos. D-138990, D-143641, others pending. Request Bulletin 10-B-1 for complete details.



Day-Brite Lighting, Inc., 5412 Bulwer Avenue, St. Louis 7, Mo.
Nationally distributed through leading electrical supply houses.
In Canada: address all inquiries to Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

216

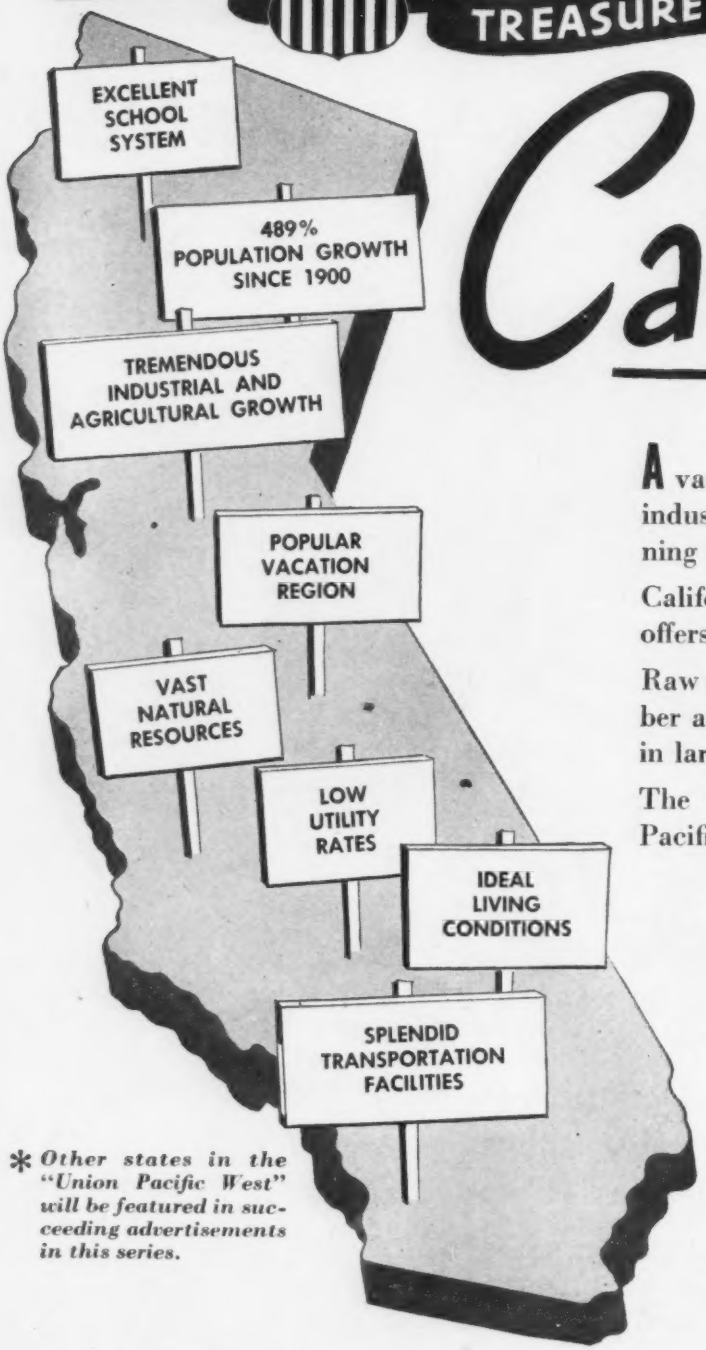
IT'S EASY TO SEE WHEN IT'S

DAY-BRITE

UNION PACIFIC

TREASURE MAP OF INDUSTRY

California *



A vast opportunity for development awaits industrial and commercial concerns planning a west coast location.

California's population, steadily increasing, offers a tremendous easy-to-reach market.

Raw materials . . . minerals, petroleum, lumber and agricultural products are available in large quantities.

The Golden State is ideally located for Pacific export trade.

Hydro-electric power, nearby natural gas and oil fields, a mild all-year climate are industrial advantages.

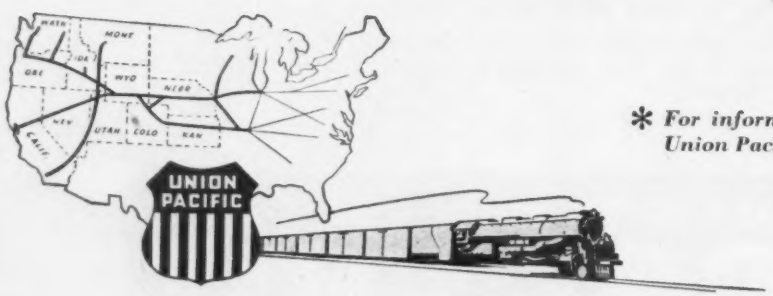
Freight transportation facilities are unsurpassed. California is one of eleven western states served by the Union Pacific Railroad.

For industrial expansion, consider California. For dependable, all-weather transportation, to or from the West, we suggest—

be Specific – say "Union Pacific"

* *Other states in the "Union Pacific West" will be featured in succeeding advertisements in this series.*

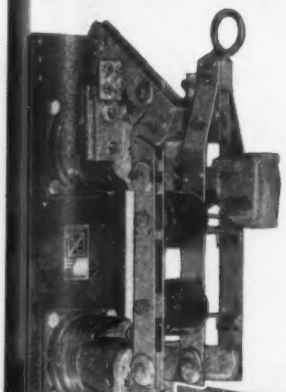
* *For information address Industrial Department, Union Pacific Railroad, Omaha 2, Nebraska.*

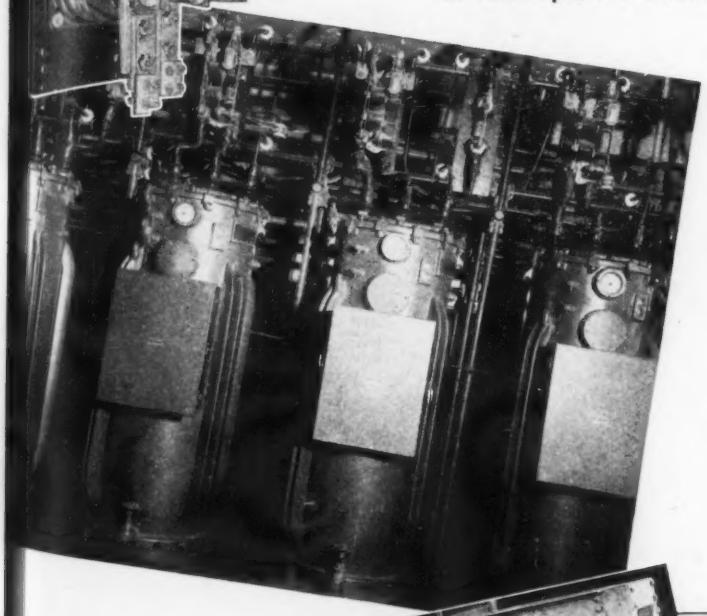


UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

NOW Convenient, Dependable Switching
IN FEEDER REGULATOR INSTALLATIONS





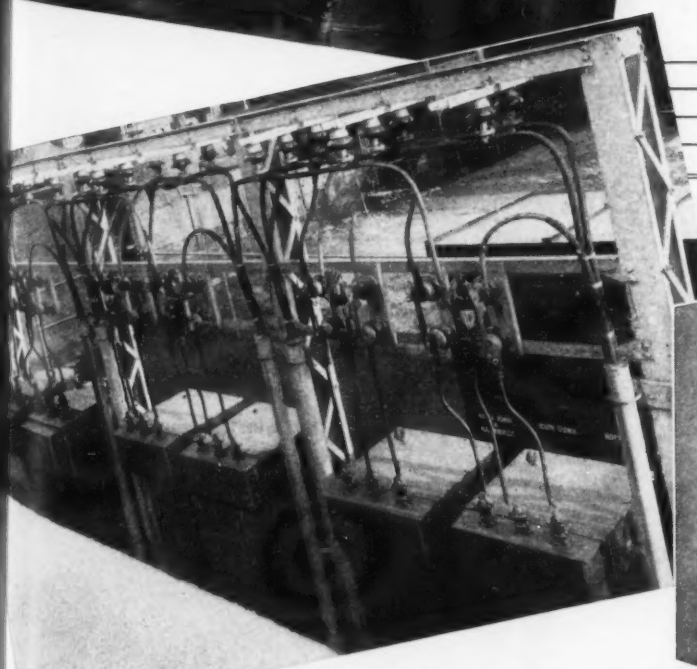
THE isolation of feeder regulators for inspection and repair becomes a greatly simplified operation with the installation of S & C Load Interrupter and By-passing Switch Combinations. With the feeder regulator adjusted to the neutral position and the control circuit interrupted, operation of the switch blade accomplishes the following:

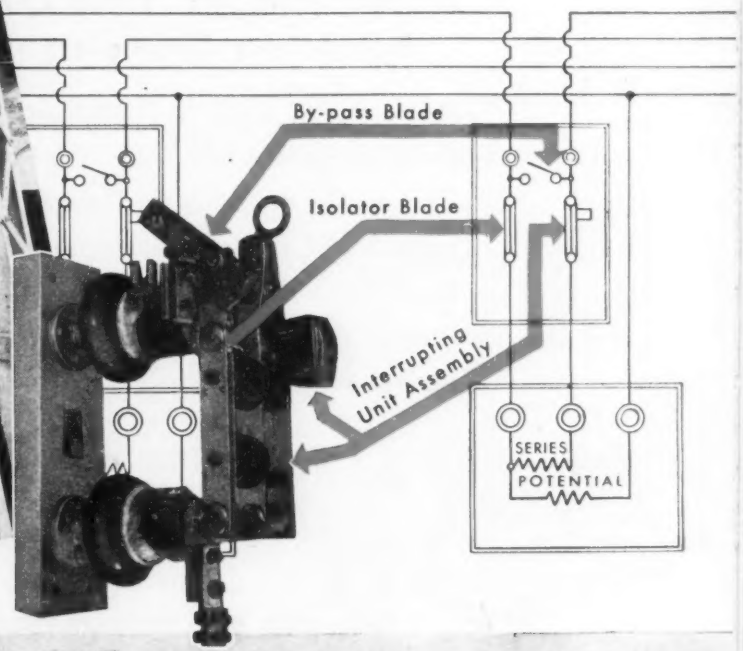
1. **Short circuits the series winding.**
2. **Interrupts the exciting current, and isolates the regulator from the line.**

In this way the regulator is isolated in one common operation, and with the assurance that there will be no arcing at the switch contacts to introduce any uncertainty.

These modern by-passing and isolating switch combinations are designed to provide a definite air break when open, and are equipped with porcelain insulation throughout. They may be installed outdoors or indoors without enclosures . . . thereby holding installation costs to a minimum.

This is just one of the many possible applications where S & C Load Interrupter Switches offer real convenience, often with distinct cost savings, and it will pay you to have full information. Write today.



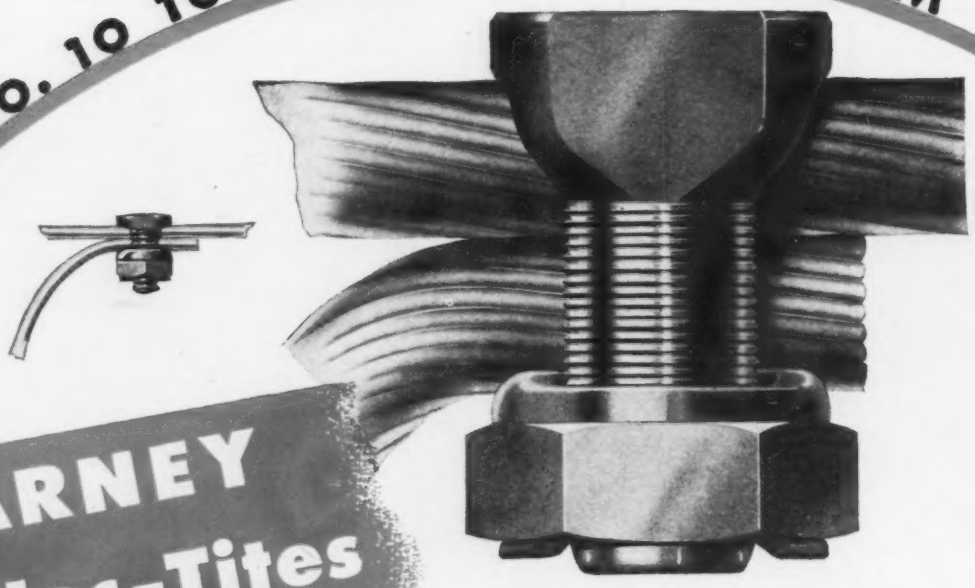


SCHWEITZER & CONRAD, INC.

4425 Ravenswood Avenue — Chicago 40, Illinois, U.S.A.

E. Cunningham & Son, Los Angeles; Geo. E. Honn Co., San Francisco; Thos. S. Wood, Seattle; Riter Engineering, Salt Lake City

FROM NO. 10 TO 1,000,000 CM



KEARNEY
Con-Nec-Tites

Assure Safer, Better Construction – Faster

Maximum Uniform Pressure Means Positive Permanent Solderless Connections

Developed and introduced by Kearney engineers, the Con-Nec-Tite is the original solderless connector. Millions of these connectors have been used—and they are still the most popular solderless connector on the market.

Here's Why–

Clean uniform threads and thread lead pilots permit the nuts to go on easier. Precision rounded corners prevent nicking wire. Hex nuts and heads fit the wrench snugly. Correct slot width and V-grooves in washer and head hold conductors under uniform pressure without injury—assures good conductivity. Weather resistant material gives long service and permits using them over and over.

Con-Nec-Tites are available for all combinations of metallic conductors. They are your best bet for best construction.

70

For Better Results

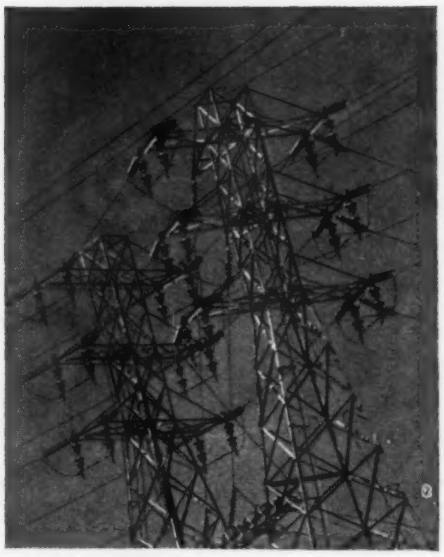
Specify Kearney Products

JAMES R. KEARNEY CORPORATION

OVERHEAD AND UNDERGROUND UTILITY EQUIPMENT

4224-42 Clayton Ave., Saint Louis 10, Mo. • Canadian Plant, Leaside, Ontario

Rural Skyscrapers



FROM ERECTION DIAGRAM . . .

Bethlehem Pacific draftsman working on erection diagram of leg extensions for 70-ft transmission towers.

THROUGH TOWER SHOPS . . .

Marking all Bethlehem Pacific galvanized angles to identify their erection positions in transmission towers.

TO STORAGE AND SHIPPING YARDS . . .

Bundling tower parts in a Bethlehem Pacific tower storage yard for rapid shipment to erection locations.

Fabricating transmission towers is a Bethlehem Pacific specialty. The company's well-situated facilities—the steel mills at South San Francisco, Los Angeles and Seattle, and the tower-fabricating shops at South San Francisco, Alameda and Los Angeles—are geared to serve the West.

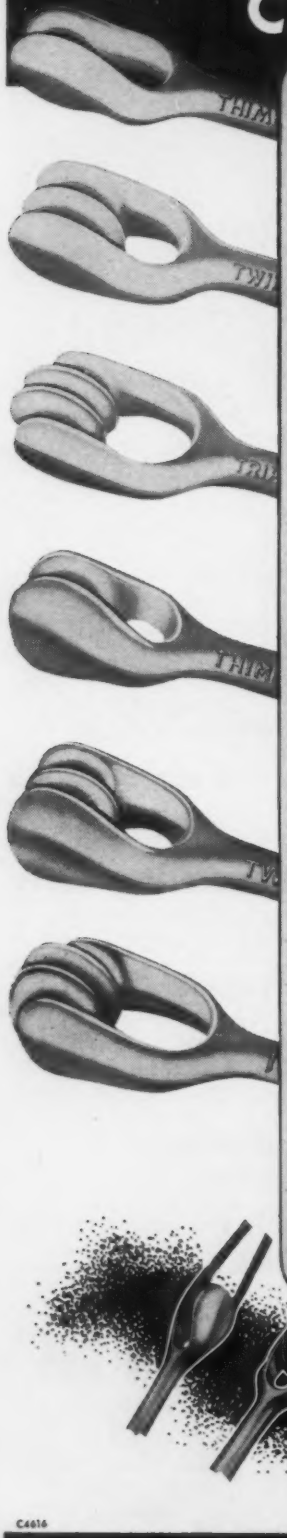
In addition to transmission towers Bethlehem Pacific also fabricates steel for bridges, hangars, buildings, and all other types of industrial structures.

BETHLEHEM PACIFIC COAST STEEL CORPORATION
Sales Offices: San Francisco, Los Angeles, Seattle, Portland, Salt Lake City, Honolulu

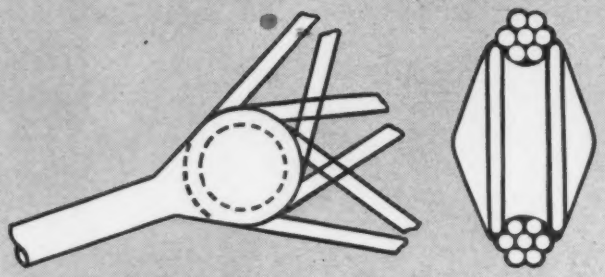
BETHLEHEM PACIFIC

BETHLEHEM STEEL

You Get Extra Strand Protection with CHANCE Improved Thimbleye Rods



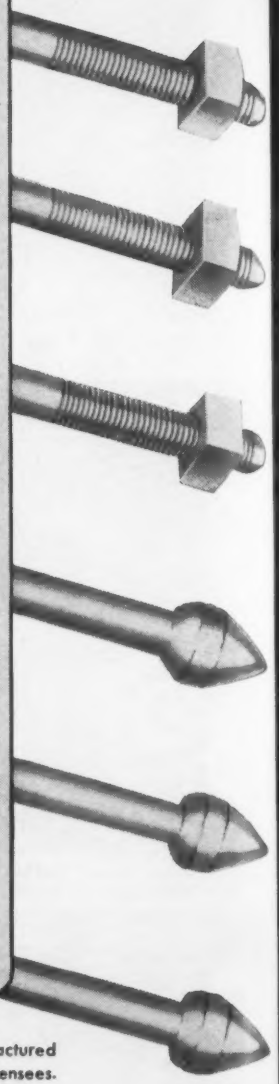
Full rounded to prevent kinking at any angle. Grooved to fit and protect guy strand.

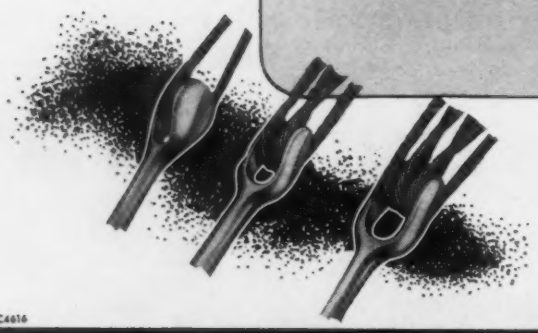


Chance Thimbleye, Twineye, and Tripleye Anchor Rods and Guying Fixtures, which have been the first choice of users for years, have been redesigned to give added protection to guy strands. The improved eye forms a perfectly shaped "Thimble" and the sidewalls and groove of the eye extend around the head of the rod, as shown in the diagram above. This keeps the strand from flattening under tension, preserves its cylindrical shape and prevents it from kinking at any one point. All grooves conform, in depth and width, to the largest cable size used with each rod or guy fixture.

All rods and fixtures are drop forged of steel and are heavily galvanized. Both Never-Creep and threaded rods are available with the improved Thimbleye, Twineye, or Tripleye for use with one, two, or three strands of cable.

For greater line security specify Chance Thimbleye Anchor Rods and get these latest improvements. Order through your regular source of supply.





Chance Thimbleye rods and guy fixtures are manufactured and sold by the A. B. Chance Company and these licensees. Joslyn Mfg. & Supply Co., Chicago, Ill. • Line Material Co., Milwaukee, Wisc. • Oliver Iron & Steel Corp., Pittsburgh, Pa. • Kortick Mfg. Co., San Francisco, Calif. • Seyler Mfg Co., Pittsburgh, Pa. • and N. Slater Co., Ltd., Hamilton, Ontario.

C4616

A·B·CHANCE CO·
CENTRALIA, MISSOURI.
SAN FRANCISCO, CALIFORNIA

ABC INDUSTRIES

CROUSE-HINDS

50th Anniversary

HALF A CENTURY OF ACHIEVEMENT

1897 Fifty years ago two men each had an idea. Huntington B. Crouse had an idea. He wanted to be a business man. Jesse L. Hinds had an idea. He wanted to manufacture articles for the electrical trade. A mutual friend brought the two men and their ideas together and on January 18, 1897 the Crouse-Hinds Electric Company was born. It manufactured electrical switches, panelboards, switchboards, and the patented Syracuse Changeable Electric Headlight for trolley cars. The headlight was the forerunner of the extensive line of lighting equipment manufactured later.

1903 The partnership was replaced by a corporation — Crouse-Hinds Company.

1906 A newly invented line of electrical conduit outlet bodies with threaded hubs was now manufactured. A new name was needed, so the word "CONDULET" was coined. It was adopted as a trade mark and registered in the United States Patent Office. Condulets were destined to revolutionize electrical conduit installation practice.

1910 Mr. Crouse formulated a firm policy of equal discounts to all distributors and equal prices to other purchasers. Revolutionary in those days, it has since been generally adopted by the electrical industry.

1911 On a 25-acre plot of land the cornerstone of the present plant was laid. Additional acres and buildings have been added since.

1915 Crouse-Hinds made the first of its now extensive line of floodlights.

1922 Crouse-Hinds built the first modern four-way three-section traffic signal.

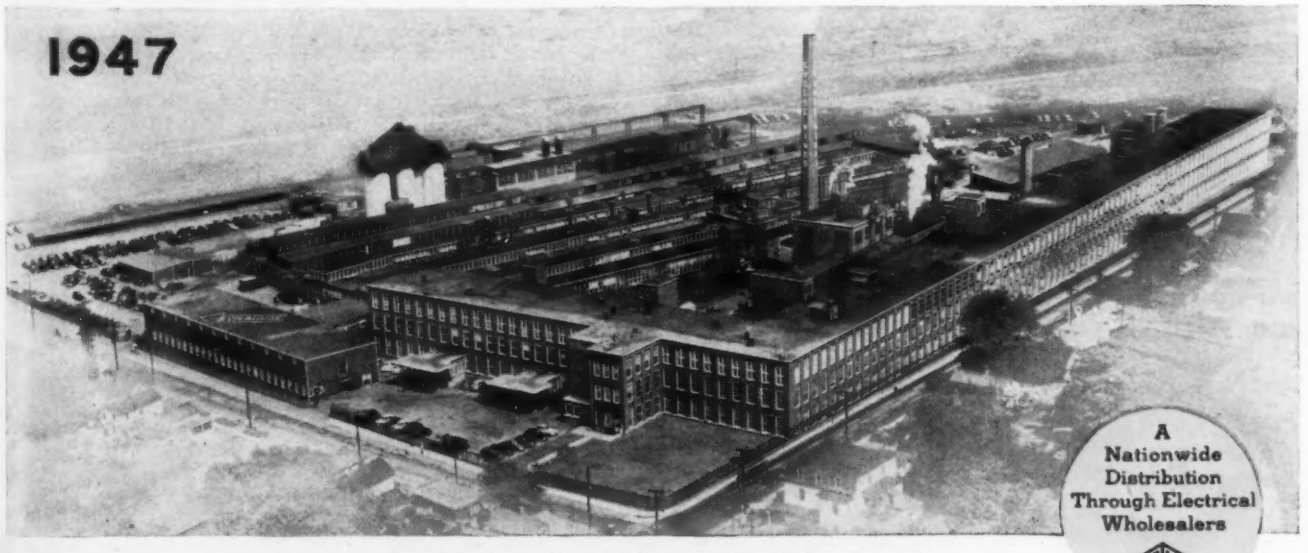
1927 Crouse-Hinds developed equipment especially designed for airport lighting.

1929 Pioneer in sports lighting, Crouse-Hinds installed a complete lighting system in a major college football stadium — at Syracuse University.

1932 Crouse-Hinds issued the first complete catalog of a line of Explosion-Proof Condulets.

1943 Upon the death of Mr. Huntington B. Crouse, Mr. William L. Hinds succeeded him as President of Crouse-Hinds Company.

1947 Now, after fifty years, the Crouse-Hinds Company has the same objectives with which it started — to make a good product better and to deal fairly and honestly with all.



A Nationwide Distribution Through Electrical Wholesalers

CROUSE-HINDS COMPANY

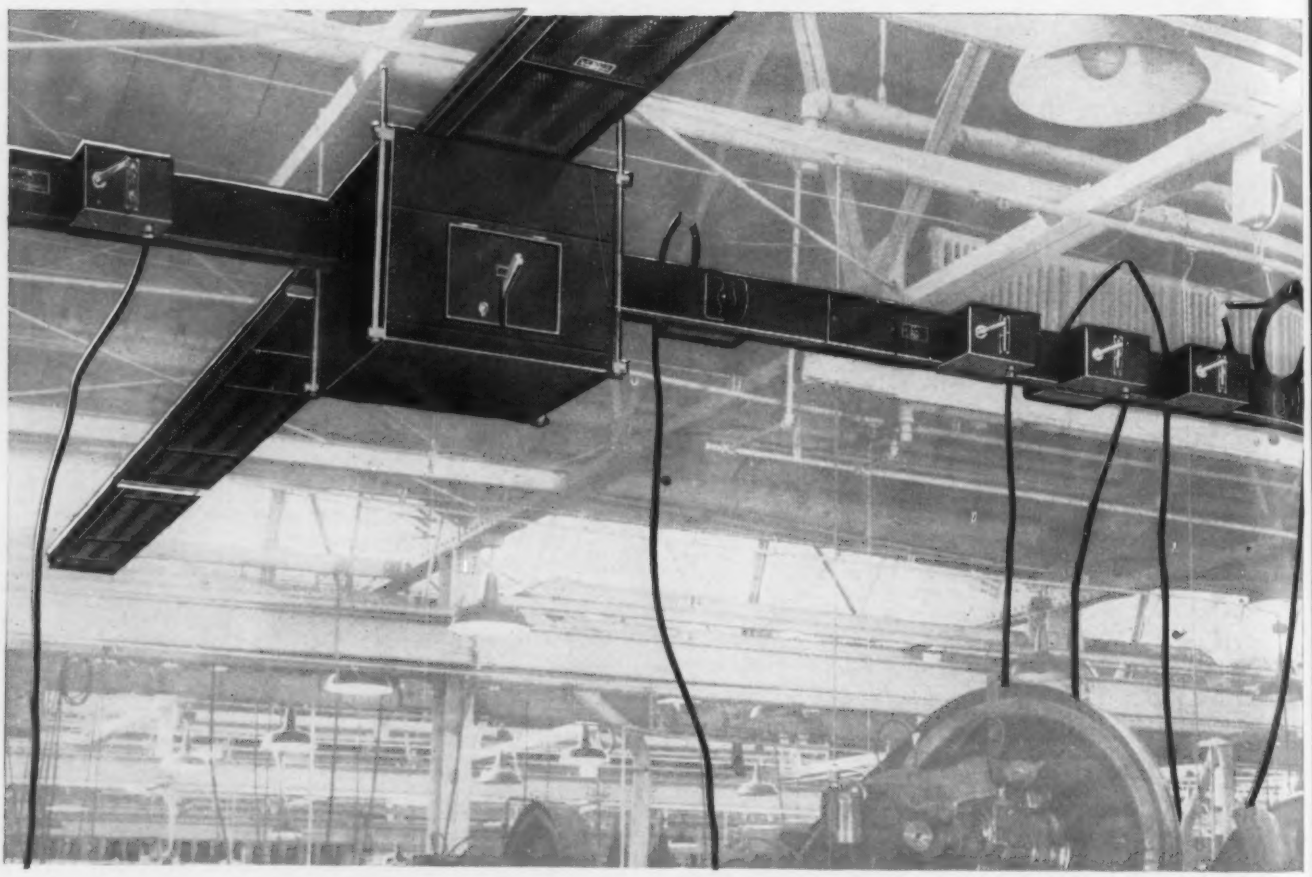
Syracuse 1, N. Y., U.S.A.

Offices: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Indianapolis — Kansas City — Los Angeles — Milwaukee — Minneapolis New York — Philadelphia — Pittsburgh — Portland, Ore. — San Francisco — Seattle — St. Louis — Washington. *Resident Representatives:* Albany — Atlanta — Charlotte — New Orleans
CROUSE-HINDS COMPANY OF CANADA, LTD., *Main Office and Plant:* TORONTO, ONT.

CONDULETS • TRAFFIC SIGNALS • AIRPORT LIGHTING • FLOODLIGHTS

Save tomorrow's costs — today

Meet today's needs—and match tomorrow's—with BullDog BUStribution Systems . . . BUStribution DUCT for plug-in power and Ventilated Lo-X Duct for feeder lines.



BullDog Lo-X Feeder Duct blocks two blows at plant efficiency—voltage drop and temperature rise.

When voltage drop pinches your power supply, output of motors and lights must suffer. And when temperature rise reaches dangerous heights, heat takes its toll on the life of your distribution system.

But BullDog Lo-X licks both of these problems. Unique design and arrangement of the bus bars, plus adequate ventilation, insures maximum conductivity and rapid dissipation of heat.

Economy doesn't stop there, either. Rugged construction cuts maintenance costs, and when major production changes require alterations of your feeder lines, BullDog Lo-X can be dismantled, moved and reinstalled with complete re-use of all materials.

BullDog Plug-In BUStribution DUCT meets the challenge of change.

Machines can be moved and be back in production with minimum losses in time and in effort, thanks to the high flexibility of this modern branch circuit system.

Every ten-foot section of Plug-In BUStribution DUCT has ten convenient outlets. That means no re-wiring, no addition of fixed outlets. Electricians need only raise the plug to the nearest duct opening, snap its contact fingers over the bus bars and bolt the plug to the casing. The whole job can be done in a matter of minutes and without interruptions for the rest of the line.

Like all BullDog Bus Duct systems, BUStribution DUCT is made in prefabricated, standardized sections for easy installation and for dismantling and reinstallation without scrapping any parts.

Call a BullDog Field Engineer. He'll show you installations of these two modern systems in a plant close by. Or, write BullDog direct for detailed folders.

ADEQUATE WIRING SERVES AND SAVES

BULLDOG

ELECTRIC PRODUCTS COMPANY

BullDog manufactures Vacu-Break Safety Switches — SafToFuse Panelboards — Superba and Rocker Type Lighting Panels — Switchboards — Circuit Master Breakers — "Lo-X" Feeder BUStribution DUCT — "Plug-in" Type BUStribution DUCT—Universal Trol-E-Duct for flexible lighting—Industrial Trol-E-Duct for portable tools, cranes, hoists.

Detroit 32, Mich. Field Offices In All Principal Cities. In Canada: BullDog Electric Products of Canada, Ltd., Toronto.

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

Coast Electric & Manufacturing Co.
1720 N. E. Sixth Avenue Tel. Garfield 2844
Portland, Oregon

Safety Switchboard Company
1445 Stevenson St. Tel. Hemlock 2470
San Francisco, Calif.

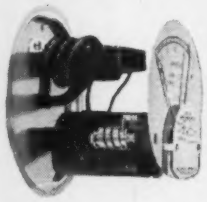
Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel. Jefferson 2224
Los Angeles, Calif.

measured DEMAND

FOR LOAD DETERMINATION AT SYSTEM CHECK POINTS..

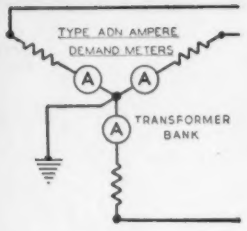
Sangamo Lincoln Type AD Thermal Ampere Demand Meters are time lagged to measure current value in proportion to the heating effect of the load—the real limiting factor on system capacity.

INDICATING TYPE ADN...



Transformer lead is continuous through Type ADN meter.

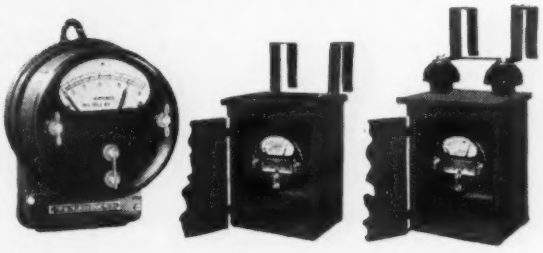
Type ADN installed on transformer in neutral lead.



Location of meters in circuit.

★ Type ADN Ampere Demand Meters, for permanent installation, are designed specially for 3-phase 4-wire Wye connected distribution banks. They are connected in each phase at the neutral point to indicate the ampere demand on each transformer. Since, with this connection, the meters are operating at ground potential, no insulating instrument transformers are required. The primary of the meter current coil is a continuous cable for connection from the transformer to the neutral point—no outage can be caused by any meter failure.

INDICATING TYPE AD

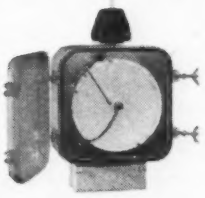


Type AD 2-wire Ampere Demand.

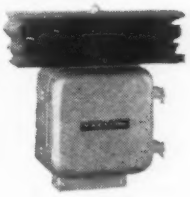
Types A and B boxes for Cross-arm Mounting.

Type AD Ampere Demand Meters, when used with either the Type A or Type B box, are readily connected across the primary cutout with the leads provided, and function in series with the line when the cutout is opened. The Type A box is for use on 2300 volts. The Type B box is equipped with 4600 volt or 7500 volt insulators.

GRAPHIC TYPE CCAO



Type CCAO graphic with insulator.



Type CCAO graphic.

Type CCAO Graphic Ampere Demand Meters, for cross-arm mounting, are for checking loads on the larger distribution transformers and on feeder taps when time and duration of demands are important. They are supplied in either single-range or multi-range capacities. The chart drive may be supplied with synchronous motor for low secondary voltages, or with 15 day hand wound clock for primary voltages. Insulators are provided for use on primary up to 7500 volts.

SANGAMO ELECTRIC COMPANY
SPRINGFIELD • ILLINOIS

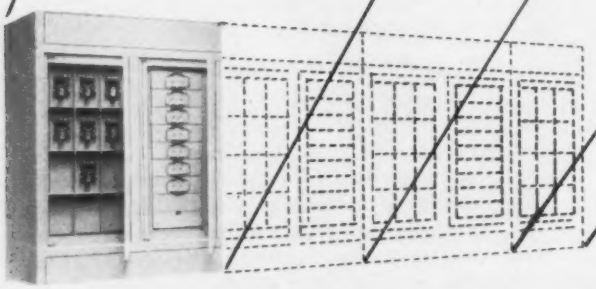
Flexibility...

SQUARE D SAFLEX SWITCHBOARDS ARE EXPANDABLE WITH YOUR FUTURE ELECTRICAL NEEDS!

Only if it would avoid success, can a plant or industry avoid expansion. So with this in mind, Square D engineers have designed the SAFLEX switchboard to provide built-in RESERVE CAPACITY. New, enclosed switch sections may be easily added as your electrical needs increase.

SAFER, TOO!

In any size, Square D Saflex Switchboards are SAFE to operate. Each individual switch section is completely enclosed—there are no exposed parts. The board itself has a completely dead front and rear. And the moment an individual cabinet door is opened, exposed parts automatically become dead. Both fire and shock hazards are eliminated.



Square D Saflex Switchboard

Yes, for flexibility, safety, and reliable feeder control operation—specify SQUARE D.

Wherever electricity is distributed and controlled

SQUARE D COMPANY

LOS ANGELES · DETROIT · MILWAUKEE

PIONEERS IN CABLE ENGINEERING

THE KERITE COMPANY

NEW YORK • CHICAGO • SAN FRANCISCO • LOS ANGELES

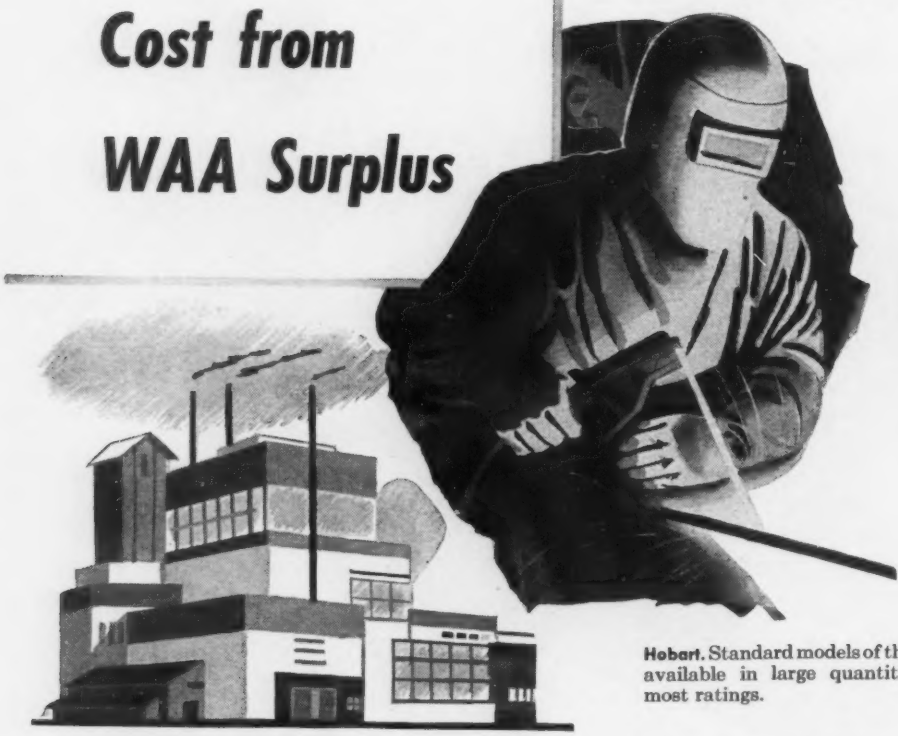
Pacific Coast Representatives: *Carlo Baldassari, 582 Market St., San Francisco 4.*
Robert A. Young & Co., 714 Olympic Blvd., Los Angeles, 15.

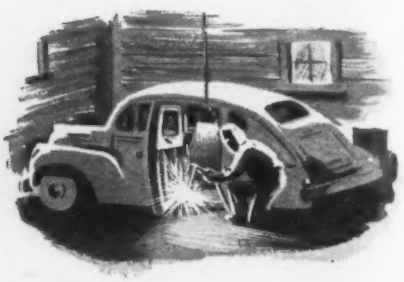
HERE'S AN ARC WELDER FOR YOUR SHOP—*At Minimum Cost from WAA Surplus*

Here are hundreds of arc welders available for immediate delivery. At WAA's low prices, no shop, however small, need be without a welder. And no shop is too big to fill its requirements from this large stock.

These are standard makes, the products of recognized manufacturers—in demand by garages, repair shops and maintenance shops and many production lines. Act today. Visit, phone or write your nearest WAA Regional Office for complete information on the availability and price of the machine you want.

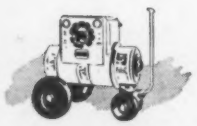
All arc welders are offered subject to prior sale.



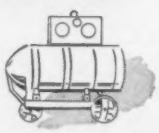


All Arc Welders are subject to priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area and then to purchase the material offered herein.

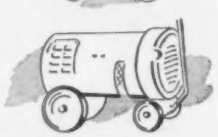
Exporters: Your business is solicited. If sales are conducted at various levels, you will be considered as a wholesaler. Any inquiries regarding export control should be referred to Office of International Trade, Department of Commerce, Washington, D. C.



Hobart. Standard models of this make available in large quantities and most ratings.



Lincoln. In all models and most ratings. Many in the popular 300-400 Ampere size.



Westinghouse. Portable models available in limited quantities. Electrodes and Welding Rods. Millions of pounds available in all types and sizes.

886

WAR ASSETS ADMINISTRATION

GOVERNMENT OWNED SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

ANNOUNCING HUBEYE!

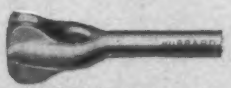
The Answer to Guying Requirements

End view showing Side Wall Support of Strand by Hubeye design.

Side view showing lay of Strand in Hubeye. Fully Rounded Bearing Area is provided.

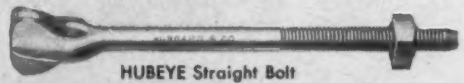
After many years of experience in producing forged eyes of all types for use without thimbles, Hubbard and Company has developed and established as its standard, the HUBEYE. This eye has received immediate approval from all Standards Engineers to whom it has been shown. Due to its universal appeal Hubbard and Company has concentrated on this design as standard for all eyes on products which involve attachments where a no-thimble eye means a saving of time, money and maintenance to users. Most of these items are illustrated or listed here.

Hubeye design consists of a rounded section of large radius around which the guy is looped. High side walls support and maintain its round shape so that no individual wire strands are subjected to excessive strain. The eye is drop forged and is stronger than the rod section from which it is made. All inner surfaces are kept smooth and are protected against corrosion by Hubbard Double-Dip Hot Galvanizing.



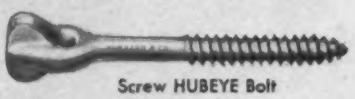
HUBEYE Anchor Rod Threaded or Drive Point and Screw Type Steel-wing.

TU-HUBEYE Anchor Rod Threaded or Drive Point



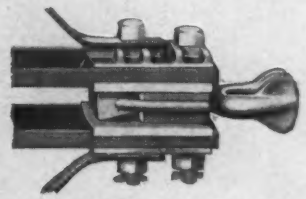
HUBEYE Straight Bolt

HUBEYE Angle Bolt



Screw HUBEYE Bolt

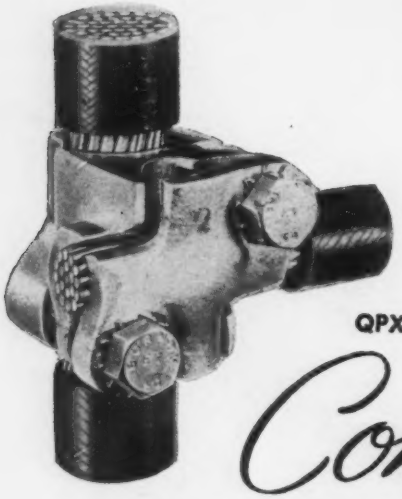
HUBEYE NUT (Threaded)



Wood Strain Insulator HUBEYE Attachment

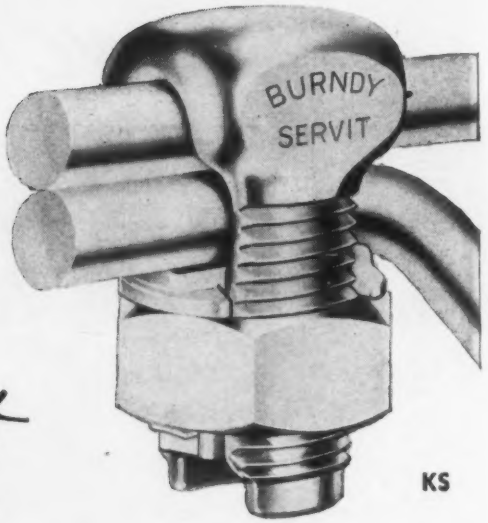
HUBBARD and COMPANY

Pittsburgh · Chicago · Oakland, Calif.



QPX

Connect with



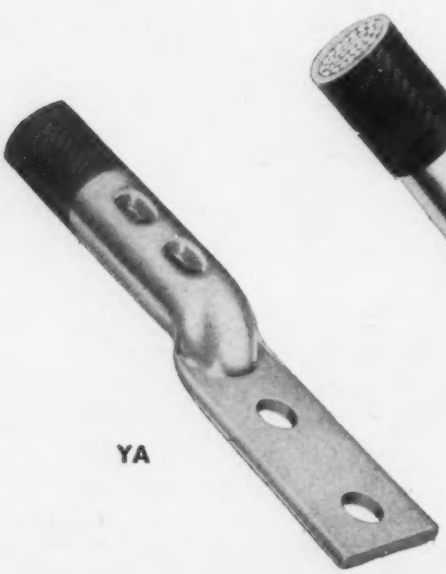
KS

BURNDY

★ Because — you can always depend on the variety of Burndy connectors to provide quick, economical and highly efficient electrical connections.

This dependability stems from Burndy's long leadership in the electrical connector field . . . which has resulted in the acceptance of Burndy connectors for all construction and maintenance requirements. Remember too, deliveries are good at Burndy. Do you have the latest Burndy Catalog?

QT



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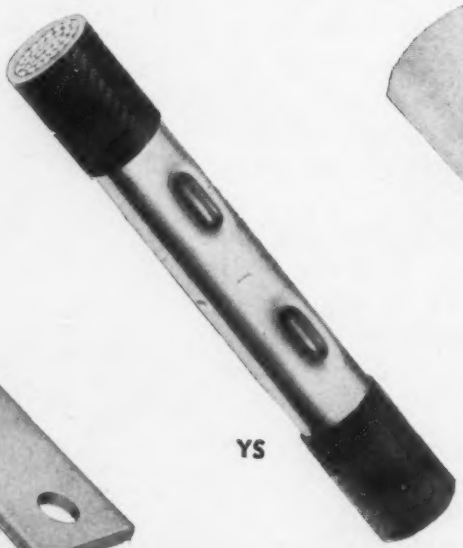

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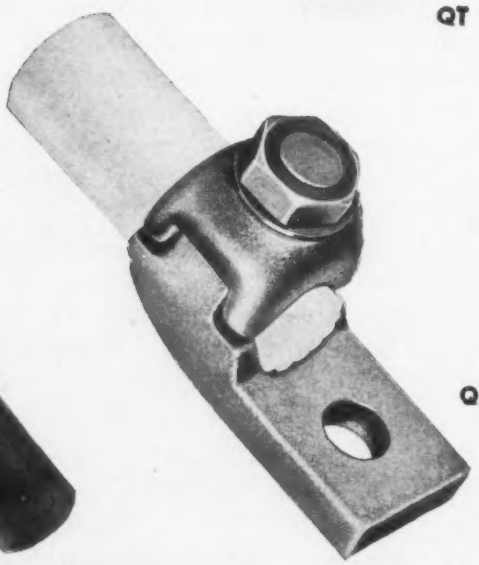


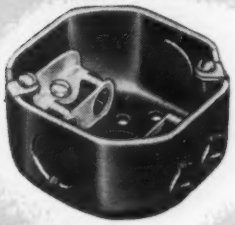
QA

BURNDY · New York 54, N.Y.

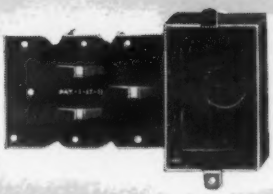
IN CANADA: Canadian Line Materials, Limited, Toronto 13
FOREIGN: Philips Export Corporation, New York 17, N. Y.

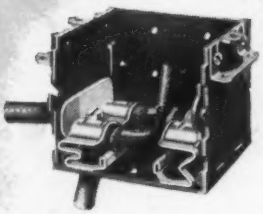
WESTERN BRANCH · VERNON, CALIFORNIA

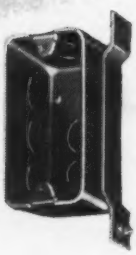
You Can Always Rely on RACO!



RACO—
Switch Boxes
Outlet Boxes







• Architects, builders and electrical contractors the country over know that they "Can Always Rely on Raco." They know that 34 years' engineering experience backs up this quality line.

Get acquainted today with Raco All-Steel Products. You, too, will find that it's the *dependable* line, the *uniform* line, the *clean* line—no ragged or rough edges; attractively finished and packed in cartons.

Remember our slogan—it's *your* assurance of a better line of steel switch and outlet boxes!

★ ***Many other types also available*** — A BOX FOR EVERY NEED

ALL-STEEL EQUIPMENT, INC.
500 Kensington Avenue
Aurora, Illinois

RACO
ALL-STEEL PRODUCTS

A Complete Line of Switch and Outlet Boxes

ALL-STEEL EQUIPMENT, INC.

'Guth LIGHTING...

IS GOOD LIGHTING . . . EVERYWHERE!

THIS MAISON BLANCHE INSTALLATION

Is Another Typical Example!

●

This successful installation . . . like hundreds of other successful GUTH installations in many types of buildings all over the country...is the result of carefully planned lighting. Planning which begins with the designing of GUTH Fluorescent...and ends only when the proper luminaires are hung in the proper locations, and in the proper surroundings to provide the utmost in effective easy-seeing illumination.

At MAISON BLANCHE, New Orleans' famous department store, the entire fifth floor is efficiently, attractively lighted by GUTH Recessed Troffers.

For stores, offices, schools, public buildings...everywhere that there's a need for well-engineered, lighting fixtures to conform with sound lighting plans . . . GUTH has the right answer.

A new Data Booklet telling you how to apply modern Recessed Troffers is available free. Write for your copy today!

Leaders in LIGHTING Since 1902

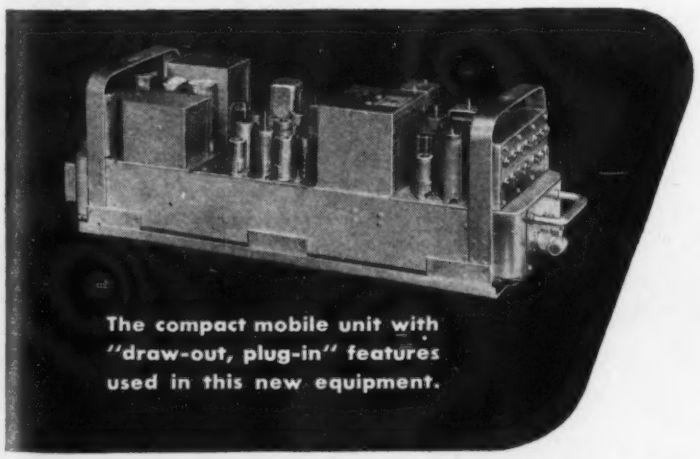
★ ★ ★ THE EDWIN F. Guth COMPANY ★ ★ ★

2615 WASHINGTON AVE. ST. LOUIS 3, MISSOURI

Outstanding!

WITH STAND-OUT FEATURES G-E 2-WAY RADIO EQUIPMENT FOR 152-162 mc

HERE'S a group of frequencies made to order for better coverage. And, General Electric has the equipment to fit your needs in those frequencies. 15, 50, and 250 watt headquarters stations, and 15-50 watt mobile stations will be available to give you the most efficient system possible. Right now, look over the features that General Electric offers you in this up-to-the-minute 152-162 mc equipment.



The compact mobile unit with "draw-out, plug-in" features used in this new equipment.

- Synchro-cycle circuit receiver locks onto the frequency of your transmitter—tends to reject unwanted signals—will not lock on adjacent channel signals—automatic in operation.
- Draw-out, plug-in features—speed inspection and servicing. Complete replacement can be made in less time than it takes to fill the gas tank.
- Low installation cost—transmitter, receiver (selective dialing and selective receiving—optional) and power supply all in one enclosure.
- Single-deck, low center of gravity mount in mobile unit—reduces the effect of continuous road shock and vibration.
- Long life, maximum reliability, and extremely low maintenance cost.
- High grade components, best of wiring and assembly methods used throughout.

G-E engineers located in principal cities will assist you in planning your radio system. Call or write your local G-E office or *General Electric Company, Electronics Department, Syracuse 1, New York.*

FIRST AND GREATEST NAME IN ELECTRONICS

GENERAL ELECTRIC

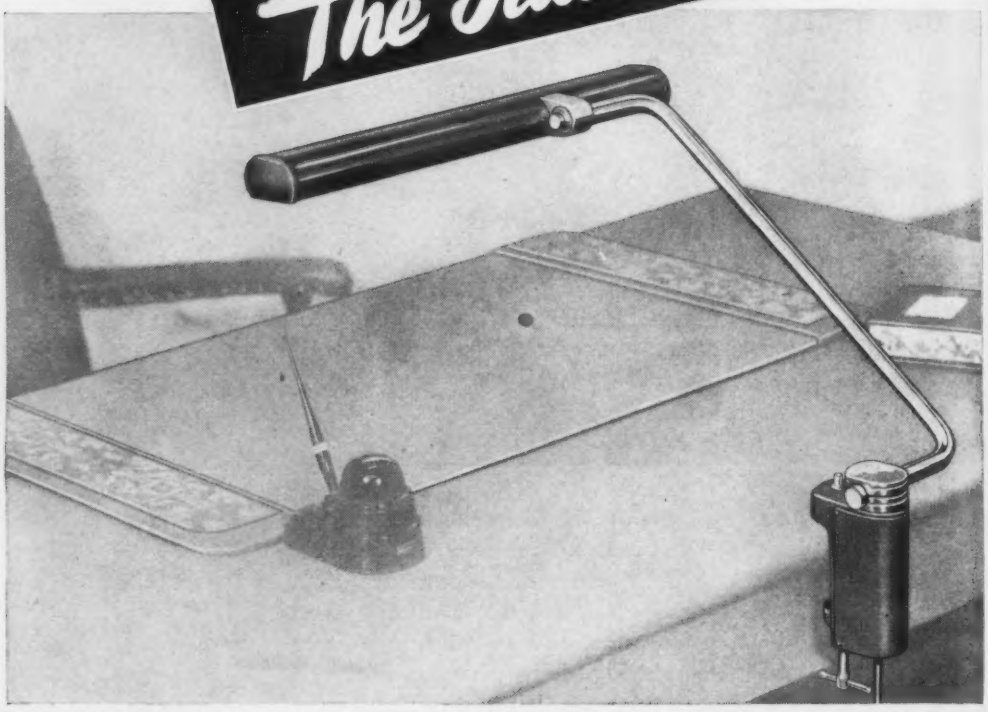
163-E13-6019

Faries Scores Again!

with a

REVOLUTIONARY FLUORESCENT DESK LAMP

The Glider

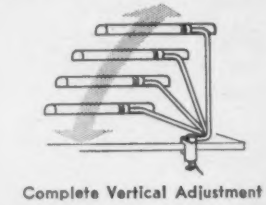


The beautiful, sturdy air-flow design shade and attractive, electroplated finish give the "Glider" an excellence that blends well with the most lavish office furnishings. Easily adjustable to any desired position by the mere touch of the hand. And . . . it *stays* in position until moved. Complete range of positions assures concentrated light without glare. Priced to please . . . sells on sight!

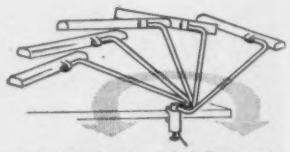
SPECIFICATIONS No. 15000

Shade: 19″ x 3¾″ x 1⅞″.
Length from center of clamp to center of shade 18″.
Clamp adjustable to 3⅛″.
Completely adjustable—horizontally and vertically.
Finish: Shade electroplated statuary bronze.
Shade fitting, arm and top fitting of clamp, satin chrome.
Clamp—rippled bronze.
Wired with turn button switch in base of clamp, 10 feet of rubber covered cord, and unbreakable plug. Equipped for 1 T8, 15 watt, 18″ fluorescent bulb. (A.C. or D.C.)

List Price $13.50



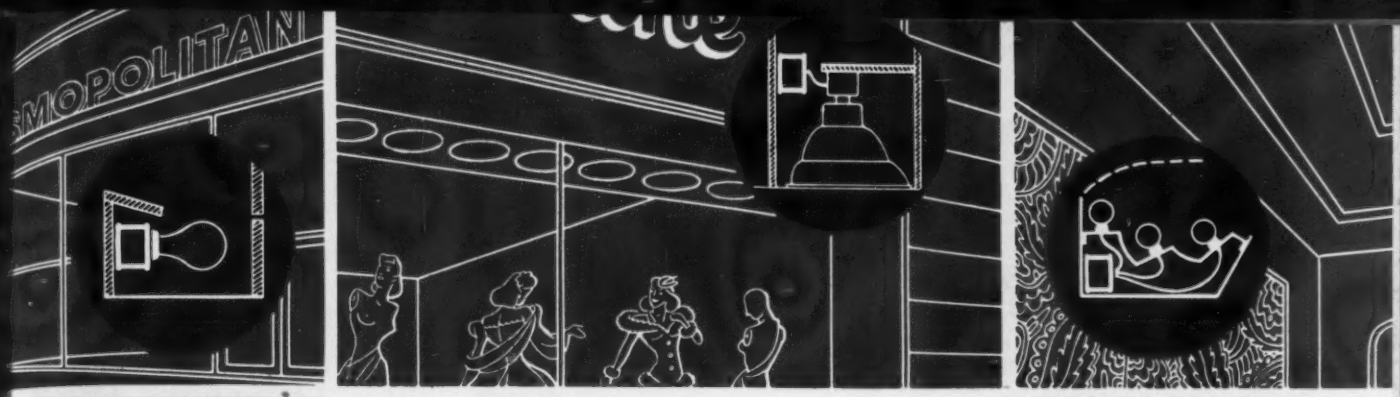
Complete Vertical Adjustment



Complete Horizontal Adjustment

Faries Manufacturing Company, Decatur, Ill.

Pioneers in Lighting Equipment Since 1880



SURFACEDUCT

Lighting Applications

Versatile NE *Surfaceduct* offers the lighting engineer a 2-piece surface raceway unsurpassed for convenience, sturdiness, circuit roominess and accessibility. It is readily adapted to any kind of an installation or lighting fixture. May be used in either exposed or concealed locations. Unique bridge locks capping securely in place yet permits easy removal for future service additions.

Eight device covers accommodate over 300 manufacturers devices. Twelve simple fittings meet all job requirements. Over-all dimensions: 1⅝" x 2⅛". Capacity *with devices installed:* Ten #10, #12 or #14 wires. Designed for loads up to 60 amp. Write for complete catalog.

Leading electrical wholesalers have stocks for immediate delivery.

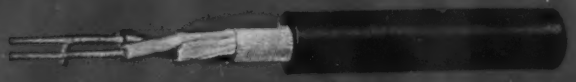
National Electric
Products Corporation
Pittsburgh 30, Pa.

NATIONAL
ELECTRIC PRODUCTS
NE
WIRING SYSTEMS
WIRES AND CABLES

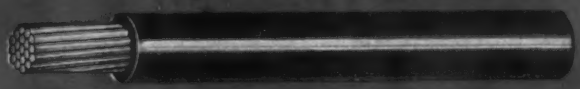
CRESCENT

Makes A Complete Line Of

ELECTRICAL WIRES AND CABLES

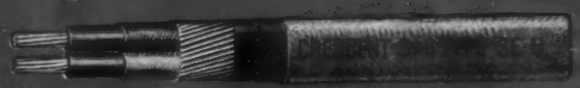


CRESCORD . *Jacketed Portable Cord*



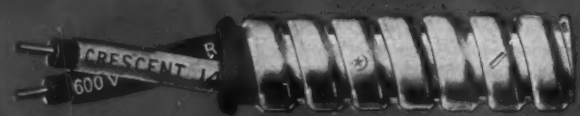
SYNTHOL *Building Wire - Types T & TW*

Rubber Covered Building Wire and Cable



Service Cable - Types SE-U; SE-A; SD

CRESFLEX *Non-Metallic Sheathed Cable*



A B C *Armored Cable*

AND AMONG OTHER TYPES THE FOLLOWING:

Bare Copper Wire & Cable
Brewery Cord
Control Cables
Fire Alarm Cable
Fixture Wire
Flexible Cords
Flexible Steel Conduit
Heater Cord
Neoprene Jacketed Portable Cable
PERMACORD
Power Cables
Shipboard Cable
Signal Cable
Slow-burning Wire & Cable
Switchboard Wire & Cable
Telephone Wire & Cable
Thermostat Cable
Trench Cable
Varnished Cambric Cable
Weatherproof Wire & Cable
Welding Cable

CRESCENT
WIRE AND CABLE

NEMA

CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, NEW JERSEY
RAY MURPHY CO., 720 E. 2nd St., Los Angeles, Calif.

PRODUCTS

that are news

Network Protector (200)

Westinghouse has announced a light-duty Type CM-88 network protector in two sizes: one for 75-kva. and the other for 150-kva. 3-phase transformer banks. The protectors are designed in both cases for 120/208-volt 4-wire, 3-phase, wye distribution. The light-duty protector operates in a similar fashion to the heavier protectors, using a 3-pole, De-ion air circuit breaker to open the secondary connection when reverse power exceeds certain values. Reclosure is by a solenoid type mechanism in the smaller protector and by a motor-operated device in the larger.

According to the manufacturer, this protector is designed to extend network operation at low cost to commercial districts in small towns and cities, fringe areas around commercial districts of larger cities, heavily loaded important residential areas. It is mounted on poles or crossarms like a transformer.

Laboratory Furnace (201)

A laboratory box furnace suitable for operation up to 3,100° F, has been developed by General Electric for such applications as melting and bright annealing of metals, sintering of powdered metals, reduction of metallic oxides, ceramic firing and copper and silver alloy brazing of metals. Since the heating units must be protected against oxidation, the furnace is limited to operations which can be performed in a protective atmosphere. Heating units are rated 20 kw., 65 volts, single-phase at 3,100° F. A cooling chamber permits materials to be cooled in a protective atmosphere preventing oxidation of the charge. Automatic temperature control is provided. A Reactrol unit is used to vary the power input smoothly and accurately in accordance with temperature requirements.

Small Motor (202)

A miniature horsepower motor claimed to operate on as little as 30 milliwatts, has been announced by Alni Corp. The Mini-motor is a self-starting, permanent magnet type, d-c motor; can operate in any position and is designed to self start in only one direction, regardless of polarity reversal. These motors are manufactured with different field coil windings for operation on various specific voltages; various bearing designs are available.

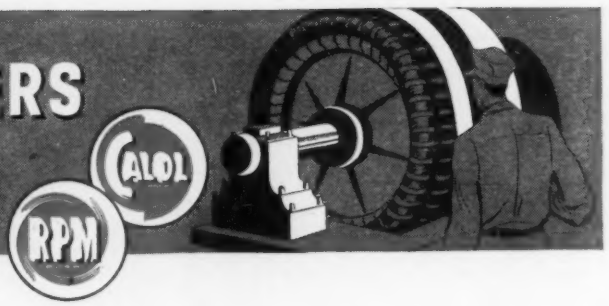
Capacitors (203)

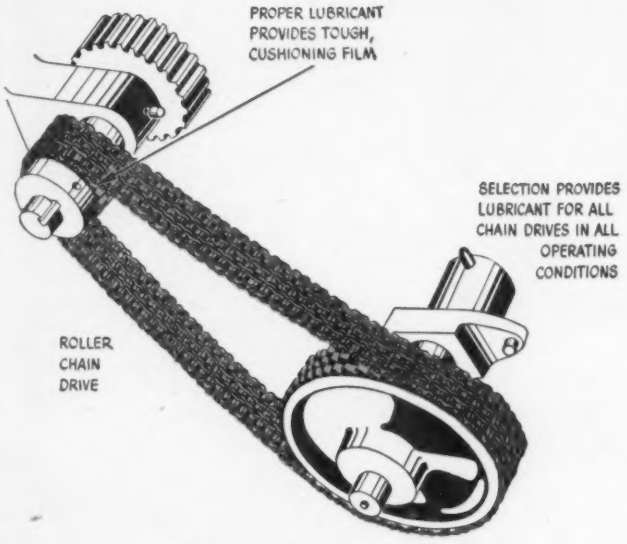
Small, 3-terminal network filter capacitors, capable of continuous use at currents up to 100 amp. with line voltages up to 250 volts a-c have been released for general use by Solar Mfg. Corp. These capacitors, available in values up to 0.75 mf., were developed for wartime applications in attenuating radio interference from motors, generators and other electric equipment.

Recorder Charts (204)

Bailey Meter Co. is producing recorder charts printed in neutral grey, claimed to be easier to read because of greater emphasis given colored records by this background.

STANDARD ENGINEERS NOTEBOOK




PROPER LUBRICANT PROVIDES TOUGH, CUSHIONING FILM
SELECTION PROVIDES LUBRICANT FOR ALL CHAIN DRIVES IN ALL OPERATING CONDITIONS
ROLLER CHAIN DRIVE

Correct lubricant reduces chain drive wear

Selection of the proper Calol lubricant for any type chain drive will materially reduce wear even under the most adverse conditions.

On a worm or exposed roller and block chain, Calol Pinion Grease—0 is recommended for high operating temperature, Calol Roller Oil—X for medium and Calol Journal Oil—135 for low. For enclosed roller or block chains, use Calol Journal Oil—165, —135 and —35 respectively.

For chains exposed to pitch, resinous materials, etc., special Calol Drier Chain Oil is recommended.

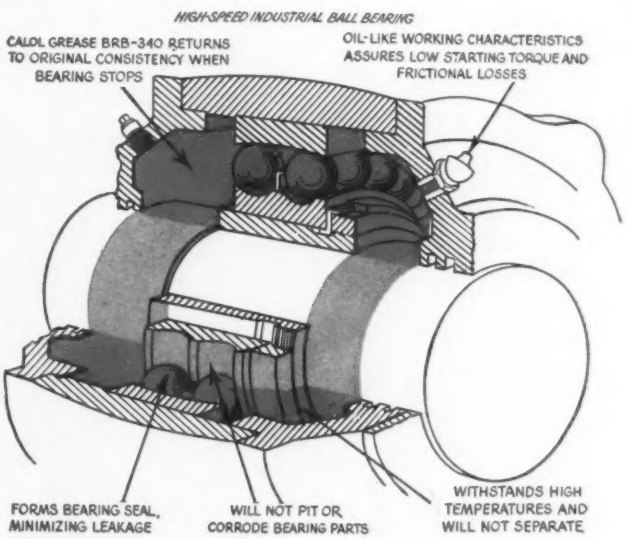
Recommendations for silent chain drives are as follows: Worn, exposed chains: Calol Roller Oil—X, high temperature; Calol Journal Oil—135, medium temperature; Calol Journal Oil—35, low temperature. New, exposed chains or oil-bath-lubricated encased chains: Calol Journal Oil—135, —35 and —25. Splash-lubricated, encased chains: Calol Journal Oil—35, —25 and —14.

New Calol Grease softens and resets

Where anti-friction bearings operate in severe conditions of temperature and speed, newly developed Calol Grease BRB-340 allows easy starting and reduces running friction to a minimum. At high shear rates, its apparent viscosity approaches that of its oil component. However, undue leakage from bearings is prevented by the peculiar ability of Calol Grease BRB-340 to reset, which causes the excess grease, swept aside by balls and rollers, to form a partial seal.

Calol Grease BRB-340 is soft, smooth and has a fine fibrous texture. It is milled by a special process that eliminates bleeding although it contains an unusual amount of oil stock.

When undergoing severe tests, Calol Grease BRB-340 showed no separation in a bearing operating 10,000 RPM at 200° F. for 528 hours. At the end of the test the bearing was in good condition.


HIGH-SPEED INDUSTRIAL BALL BEARING
CALOL GREASE BRB-340 RETURNS TO ORIGINAL CONSISTENCY WHEN BEARING STOPS
OIL-LIKE WORKING CHARACTERISTICS ASSURES LOW STARTING TORQUE AND FRICTIONAL LOSSES
FORMS BEARING SEAL, MINIMIZING LEAKAGE
WILL NOT PIT OR CORRODE BEARING PARTS
WITHSTANDS HIGH TEMPERATURES AND WILL NOT SEPARATE

Standard Fuel and Lubricant Engineers are always at your service. They'll gladly give you expert help — make your maintenance job easier. Call your local Standard Representative or write Standard of California, 225 Bush St., San Francisco 20, California.

FOR EVERY NEED A **STANDARD OF CALIFORNIA** JOB-PROVED PRODUCT

Illustrated: The Standard Electromode for ceiling or wall suspension.

FOR LOCAL HEAT

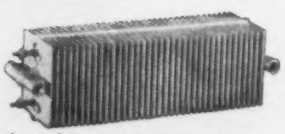
WHEN FIRES ARE BANKED

WHENEVER your central heating plant is down—on weekends, holidays and in-between seasons—and local heat is required for clerical, engineering, factory or executive offices, Electromode Unit Heaters fulfill every requirement.

Convenient—with thermostatic control, operation is entirely automatic. *Economical*—no current is consumed except when actually in use. *Efficient*—100% of the electricity is transformed into heat. *Easily "wired-in"*—no piping or piping connections are required.

Your electrical supplier can recommend sizes to meet your needs . . . and tell you about the Electromode Portable and Bilt-in-Wall Heaters for home, camp, office, factory or farm.

SAFE HEATING ELEMENT



The exclusive Heating Element makes Electromode the safest All-Electric Heater on the market. U. S. submarines use it. There are no exposed wires . . . no danger of fire, shock or burn. Resistors are insulated, sheathed and embedded in a one-piece finned aluminum casting for maximun safety and reliable heating service. Approved by Underwriters' Laboratories.

ELECTROMODE
All-Electric UNIT HEATERS

For further information, send for Bulletin 45-U and Heating Survey form.

ELECTROMODE CORPORATION • 59-2 Crouch St., Rochester 3, N. Y.

WEST COAST FACTORY REPRESENTATIVES—RUSSELL AND COMPANY, 1355 Market Street, San Francisco 3, Calif.; HARRY F. HALDEMAN, INC., 1106 South Hope Street, Los Angeles 15, Calif.; FRED W. CARLSON, 307 Wall Street, Seattle 1, Wash.; JOHN W. LADLOW, P. O. Box 1784, Phoenix, Ariz.

Switches (205)

Wadsworth front-operated general duty safety switches are now available with a newly developed heavy-duty toggle type switch, the company announces. Features claimed for the switch are: rugged construction with few parts; snap-action, double break type mechanism, with self-aligning blade; extra-heavy gage current carrying parts to perform at the full rated 30-amp. capacity; large goggle type lever. Cabinet is finished in baked enamel.

Breaker (206)

An improved MO 4 multibreaker has been added to the Federal Electric Products Co. line. For use as a service entrance breaker and a distribution load center, this unit incorporates both thermal and high-speed magnetic tripping action. The bimetal element functions only when a sustained overload or heavy short circuit occurs and does not trip under harmless, momentary overloads. The magnetic trip clears the circuit instantly under moderate or heavy short circuit conditions. The unit measures 5 1/16 in. wide, 7 3/16 in. high and 2⅞ in. deep. Available in single-pole branch-circuit capacities of 15, 20, and 30 amp. By means of a handle tie furnished with each unit, the MO 4 can be converted to a device with one or two double-pole, 3-wire circuits.

Foot-Operated Switch (207)

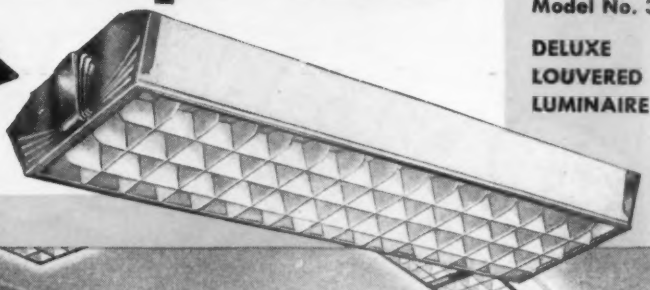
A foot-operated switch for series circuits only has been announced by Electronic Controls Inc. Switch mechanism is snap action type and can be supplied SPST either normally open or normally closed as long as treadle is held depressed. Also available SPDT. Power handling capacity is 1,000 watts at voltages up to 220 volts a-c or 32 volts d-c, non-inductive loads.

Tester, Screw Driver (208)

A combination electrical testing instrument and screw driver is being marketed by Allaire Associates. A neon bulb housed in the catalyn case lights up to indicate electrical current. In testing house and commercial current, the cap is removed and the screw driver tip placed in the socket or on the wire; to test spark plugs the unit is left intact and the screw on top of the cap is touched to the plug.

Super Light for a Super Mart!

buy... MITCHELL



Model No. 3011
DELUXE
LOUVERED
LUMINAIRE

BEFORE—
The Food City Market, huge Supermart in Pittsburgh, Pa., as it appeared before re-lighting. Average overall illumination, only 5 foot-candles by actual measurement.

AFTER—
Here's the same Food City Market, "sales-activated" by MITCHELL Fluorescent Lighting. 85 foot-candles average maintained! Achieved by MITCHELL DeLuxe Louvered Luminaires No. 3011 and No. 3009 in continuous row mount.

Two different stores? No—it's the same place—but the attractive, sales-inviting establishment pictured at the right was created by a MITCHELL Fluorescent Lighting installation that changed the average foot-candle reading from only 5 to a full 85! Every bit of this new abundant high-level illumination provides glareless, even light over the entire store area—superior light that creates a "selling" atmosphere.

Customers now find the products they want quickly and easily—they *buy more* because they *see more* to buy. Salespeople work with less strain and fewer errors—for bigger sales and profits. Here is "sales-engineered" lighting by MITCHELL—from every angle, the Better Light for Better Business . . .

Installations like these build tremendous user acceptance for MITCHELL Lighting—mean better business for the wholesaler. MITCHELL sales are package transactions—trouble-free volume business. MITCHELL installations are easy, smooth jobs for the contractor—time-saving, profitable business...

Mitchell Manufacturing Company
2525 CLYBOURN AVENUE, CHICAGO 14, ILLINOIS
Far West: *Complete Modern Plant and Sales Office at Los Angeles Serves the Entire Pacific Coast Area*
1019 NORTH MADISON AVENUE, LOS ANGELES 27, CALIFORNIA

MITCHELL *Better Light for Better Business*

Makers of Commercial and Industrial Fluorescent Lighting Equipment Store Window Lighting • Spotlights and Floodlights • Desk Lamps • Portable Floor and Table Lamps • Bed Lamps • Ultraviolet and Infrared Health Lamps • Residential Lighting Specialties . . . Rad-i-Air Germicidal Units (made by Tru-Air Ultraviolet Products Co., Los Angeles)

YES—
BRONCO 60
has DU PONT
NEOPRENE
JACKET

Here's wire and cable that will provide even longer life—Bronco 60 with du Pont Neoprene Jacket. Neoprene is vulcanized onto Bronco 60 wire and cable by our own exclusive process. That means it is flame resisting; impervious to acid, alkali, moisture and oil, and highly resistant to sunlight cracking, crushing, wear and tear.

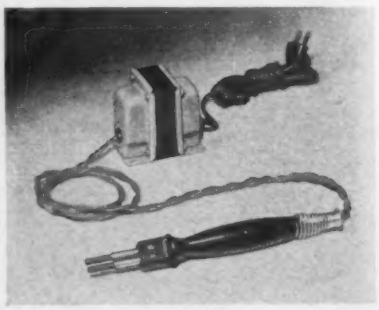
Always Specify BRONCO

Send for new, Complete Catalog

WESTERN
INSULATED WIRE CO.
1001 East Sixty-Second St.
Los Angeles 1, California

Soldering Tool (209)

Thermador's ST-1 soldering tool was designed for precision work and is recommended by the manufacturer for radio repair and general assembly jobs. It requires no preheating, plugs into convenience outlet. Operating current is in use only through actual contact with metal. Fork type design is said to eliminate need for grounding work. Standard equipment includes the company's "Thermatite" transformer, 6-ft. rubber covered primary cord and 4-ft. flexible cotton covered secondary heater cord. Voltage across the carbon rods is 6 volts. Specifications: 96 watts, 50/60 cycles, 110-120 volts a-c, length including carbon 7 in., weight of tool 3 oz., weight with transformer approximately 3½ lb.



Meter Tester (210)

Electrical Facilities Inc. has announced the Knopp Type TE-5 meter testing equipment. The equipment is housed in a steel cabinet across the top of a steel desk. The cabinet contains an eye-level rotating standard and supports the meter hook and an adjustable swinging arm mounting for the timer phototube and light source. Dead front switches to control all operations are mounted at arm's reach on the cabinet front.

Light load and full load currents may be applied to meters rated from 2.5 to 50 amp., 120 to 480 volts, by operating selector switches. A special feature permits the testing of 3-wire, single-phase meters as if they were 2-wire meters. In testing polyphase meters, either element may be tested separately, bucking or in series.

Adapters are available for testing all single-phase bottom-connected meters from 1914 models to and including Type A meters and for mounting all socket type meters. A panel mounted G-E photoelectric timer starts and stops the rotating standard and counts the meter revolutions.

The Knopp Uniload system applies 5 amp. and 120 volts to the rotating standard regardless of the current and voltage supplied to the meter under test and the rotating standard and the multirange instrument transformers need be calibrated at only one load point on one range.

Opinion Meter (211)

An instrument designed to measure and indicate the composite opinion of as many as 120 individuals has been announced by G-E. This meter consists of a large indicating unit and up to 120 hand-held stations. On the individual station is a dial calibrated from 0 to 100 and an adjustable pointer. Zero to 50 is the "no" side of the dial; from 50 to 100 is the "yes" side. There is an "off" position, for those not wishing to express an opinion. Results of the individual stations are summated by the indicating unit and the group average appears on the large dial in about ten seconds.

"You asked for it!"

Here's what one utility executive looks for in fluorescent lighting fixtures:

(1) "We are interested in knowing that the fixture will give excellent service to the consumer. If we recommend a fixture, naturally, we want our customer who buys on our recommendation to be pleased with the product." (2) "And we want to know whether or not the fixture has built-in capacitors which will insure constant high power factor."

And here's why CERTIFIED FLEUR-O-LIERS give him what he wants:

(1) Fleur-O-Liers, made by a group of leading fluorescent fixture manufacturers, are built to exacting specifications, set up by lighting experts, for *performance, construction* and *service.* They are tested, checked and *certified* as meeting those specifications by Electrical Testing Laboratories, Inc., and identified by the Fleur-O-Lier label on every fixture. (2) Specifications for Certified Ballasts in Fleur-O-Liers require *power factor correction* . . . and assure reliable operation.

Through the Certified Fleur-O-Lier Program contractors and distributors, as well as utilities, can feel assured that their customers will get dependable, economical service and superlative lighting performance from fluorescent fixtures labelled "Certified Fleur-O-Lier".

FLEUR·O·LIER

Manufacturers

Fleur-O-Lier is not the name of an individual manufacturer, but of a group of 27 leading fixture manufacturers. Participation in the FLEUR-O-LIER MANUFACTURERS' program is open to any manufacturer who complies with FLEUR-O-LIER requirements.

KLEINS
FOR MEN WHO
WANT THE BEST
Every good workman appreciates high quality in the tools and equipment he uses. To a lineman, however, this regard for quality is more than admiration for fine craftsmanship. The lineman daily trusts his very life to his safety strap, belt and climbers—and under such conditions high quality is more than a matter of pride.
Good workmen know that there's no substitute for experience. It is the years of expert craftsmanship back of every piece of Klein equipment that make Klein belts and safety straps—Klein climbers and grips—Klein pliers and wrenches the first choice of linemen today as they have been "since 1857."
ASK YOUR SUPPLIER
Foreign Distributor: International Standard Electric Corp., New York
This book on the care and safe use of tools will be sent on request.
Since 1857
KLEIN TOOLS
EST. 1857
TOOLS
KLEIN
Mathias KLEIN & Sons
Established 1857
Chicago, Ill., U.S.A.
3200 BELMONT AVENUE, CHICAGO

Wire Stripper (212)

A "hot blade" wire stripper for insulation up to ⅜-in. diameter is offered by Ideal Industries. Two electrically heated blades will strip cotton, silk, synthetic and rubber-covered insulation from fine stranded or solid conductors, quickly and without injuring the wire, the manufacturer states. Each blade has an individual heat control and transformer to permit raising or lowering the burning temperature as required for different insulations. A high-low switch controls the adjustment of heat for heavy, average and light insulation. A built-in exhaust draws smoke and fumes of burning insulation away from the blades; strippings fall into a water drawer. Blades may be set at exact wire diameters and an adjustable stop controls stripping length. Standard in 115 volts, 50-60 cycles; other voltages and frequences available.

Torsion Tester (213)

A torsion testing machine for wire has been developed by the Sonntag Scientific Corp. and is sold exclusively by the Baldwin Locomotive Works. This machine will test bronze and copper trolley wire, telephone and telegraph wire and steel tie wire of .090- to ¾-in. diameter, in accordance with ASTM specifications. Three twisting speeds, 10, 20 and 30 r.p.m., with reversible rotation, are available with a maximum torque of 1,000 in. lb. Stresses up to 80,000 lb. per sq. in. can be secured on ½-in. specimens, the manufacturer claims.

Earth Borer (214)

Four Wheel Drive Auto Co. is again offering the International earth boring machine mounted on an SU model FWD truck. The 1947 model has a 16-ft. tower and will bore holes up to 54-in. diameter, 20 ft.

deep. Standard equipment includes 20- and 24-in. augers. The auger is mounted on a 108° turntable so that holes may be bored at the rear or at either side of the truck; it can be tilted to bore at any angle up to horizontal with the frame of the truck.

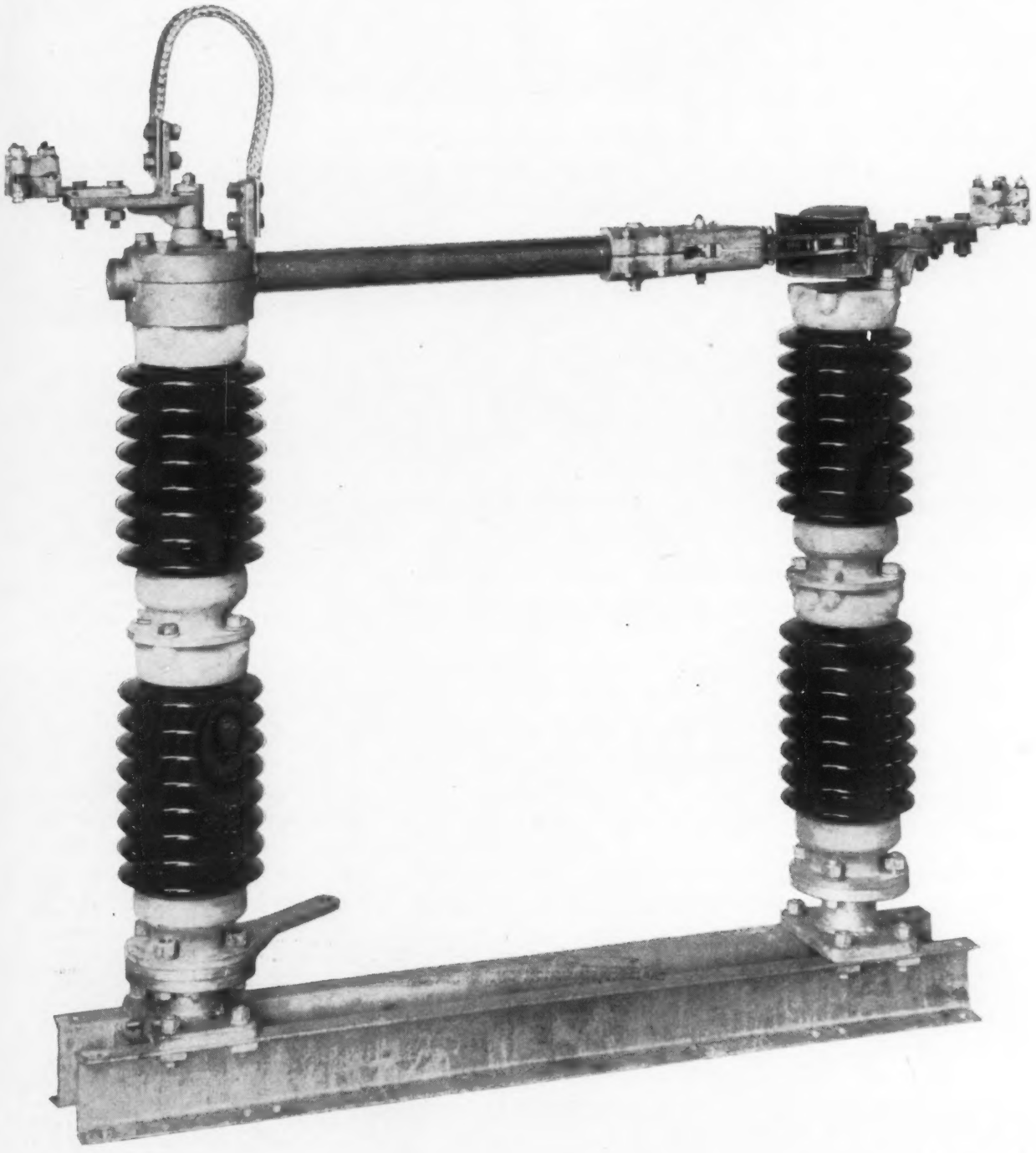
Coil Winder (215)

A new coil winder is being manufactured by Continental Electric Co. under the trade name, Adjustable Concentric Winding Head, Model U. It has nine pair segments, large to small sizes, eight of them adjustable by screw. A chart for setting segments is provided and the setting may be made without removing the head from the machine. This winding head makes concentric coils for all types and sizes of single-phase motors from 1/20 hp., 24-slot 6-pole stator to 3 hp., 36 slot, 2-pole stator, the latter seven coils to a group.

Cole Electric Co.

1510 So. Los Angeles St. Los Angeles (15), Calif.

PRospect 2068



AIRBREAK DISCONNECTING SWITCH
69,000 Volts—600 Amperes, Type LU, T.P.S.T. Horizontal break, Group Operated (One pole shown)
For upright, vertical or underhung mounting

THIS IS A TIME FOR DECISION!

Synthetic or Natural

Every once in a while a basic decision must be made by every growing industry. The wire and cable industry must make such a decision now. Natural rubber is becoming more plentiful. Is it to resume its former important place in wire and cable insulations? Have synthetic rubber insulations made a place for themselves? How do they compare with those made with natural rubber?

We have attempted to answer these questions in a new "Report to Industry." Available data show that most wires and cables are better with synthetic rubber insulations. We are well pleased with synthetic rubber. Our experience with synthetic rubber during recent years has persuaded us that we can best serve you by using it in the future.

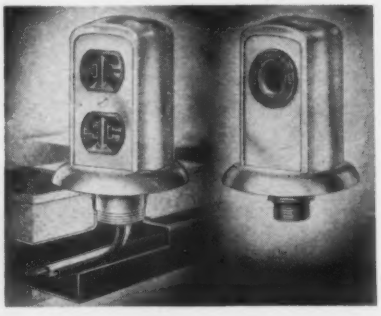
Every user of insulated wires and cables is interested in this subject. If you have not already received a copy of our report, we suggest that you ask for "Our Third Report to Industry on Synthetic Rubber Insulations." In it we have explained our reasons for deciding in favor of synthetic rubber and have included comparative data showing the present relative values of natural and synthetic rubber insulations.

Simplex-WIRES & CABLES

SIMPLEX WIRE & CABLE CO. 79 SIDNEY ST. CAMBRIDGE 39, MASS.

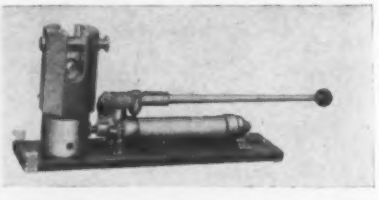
Service Fittings (216)

National Electric Products Corp. has two new service fittings for use with its underfloor wiring duct: No. 7903, with standard duplex T-slot receptacle, for high potential light and power wiring; No. 7904 for telephone, buzzer and intercommunication low potential wiring in plant offices and office buildings. Of the same general appearance and construction, the fittings are adapted to screw into standard outlets of the underfloor duct. Either model is wired and assembled with a single screw through the housing top. The one-piece housing double locks in the flange base. No. 7903 can be furnished with 3-pole twist-lock receptacles instead of standard duplex, if desired. Telephone or signal wiring issues from No. 7904 through a rounded composition bushing.



Tool (217)

National Telephone Supply Co. is offering the Nicropress No. 635 hydraulic tool with sleeves for full tension splicing of large conductors and static wire. It has interchangeable compression dies for a range of copper, copperweld, aluminum and steel conductors in larger sizes; weighs 50 lb. (including carrying case) and is said to exert easily 70,000 lb. of compression. The manufacturer states that sleeves for the larger copper and copperweld conductors are "stepped", resulting in very tight compressions through the center of the splice and "velvet" presses at the ends.



Contact Springs (218)

Gibson Electric Co. is making contact springs of beryllium copper. Beryllium copper has a modulus of elasticity of 18,500,000 as compared to 16,800,000 for phosphor bronze and is said to have better fatigue resistance. Its tensile strength, developed by heat treatment, is from 175,000 to 200,000 psi.; its electrical conductivity is 25 to 32% IACS.

Connector (219)

A "4-in-1" solderless and tapeless wire connector has been added to the Holub Industries line and, according to the manufacturer, has Underwriters' approval for joining 46 different wire combinations ranging from two No. 18 to four No. 14 with one No. 18 or two No. 12 with one No. 16, solid or standed wires.

The meaning of the RLM label to *BUYERS....SPECIFIERS....SELLERS* of Industrial Lighting Equipment

This RLM Label affixed to an industrial lighting unit certifies that the unit has been manufactured to conform to RLM rigid specifications. RLM Specifications are drafted by a Technical Committee, guided by the findings of the *Illuminating Engineering* Society, the recommendations of the *Better Light—Better Sight Bureau,* and other recognized industry associations. These factors that provide (1) *Economy through more* Light at No Extra Cost, (2) Low Maintenance Cost and Long Life.

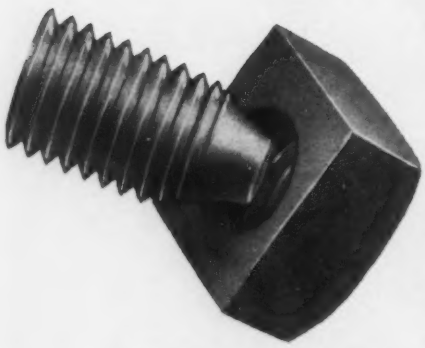
Whether you buy or sell industrial lighting, play safe by specifying lighting equipment built to conform to up-to-the-minute RLM Specifications and bearing the RLM Label. Copies of all the latest RLM Specifications may be secured through any manufacturer using RLM inspection and certification service, or direct from RLM Standards Institute.

RLM STANDARDS INSTITUTE

307 N. MICHIGAN AVENUE SUITE 420 CHICAGO 1, ILLINOIS

DEPENDABLE POLE LINE CONSTRUCTION DEMANDS

such as



★ Handipoint Bolts

and

★ Pole Steps

and

★ Guy Clamps

Manufactured and Stocked For Your Convenience On The Pacific Coast By

KORTICK
MANUFACTURING COMPANY

OFFICE—PLANT—WAREHOUSE
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Telephone GArfield 8080

Warehouse Stocks: Los Angeles, San Francisco Portland, Seattle, Honolulu, T. H.

BULLETINS

data books, etc.

Electronic Tubes (220)

"Easy Guide to Electronic Tube Data" has been prepared by Westinghouse to aid in selection of replacements. Tubes are listed according to class, and essential technical data is given on each. An index, arranged numerically by type number, tells the class to which each tube belongs, its warranty class and list price.

Synthetic Rubbers (221)

Answering the question as to the future of synthetic rubbers, Simplex Wire & Cable Co. has published its "Third Report to Industry on Simplex Synthetic Rubber Insulations." This 12-page booklet has sections on natural versus synthetic rubber; typical compounds; specifications; conclusions. Five tables are included.

Lighting Data (222)

General Luminescent Corp. has a 4-page catalog sheet for use of those who figure lighting layouts and levels. Mounting dimensions and utilization information are given for Colovolt cold cathode commerical and industrial fixtures.

Equipment (223)

"More Power to U.S.A." is the title of a 32-page bulletin released by Allis-Chalmers and describing the company's generating, substation, transmission and distribution equipment.

Motors (224)

Emerson Electric capacitor-start motors are pictured and described in a 4-page bulletin, X5526.

Commercial Cooking (225)

In a 15-page illustrated booklet, Associated Products Inc. gives information on its Akron electric cooking equipment for hotels and restaurants. Ranges, fryers, griddles and other food service appliances are described.

Ventilating Fans (226)

Holcomb & Hoke Mfg. Co. Inc. is offering a 48-page guide to selection and installation of its Silent Breeze ventilating fans for residential, commercial and industrial applications.

Small Switch (227)

Micro Switch in its recent "Uses Unlimited" describes the new V3-14 low-torque switch, a very small SPDT switch actuated by rotary motion.

Infrared Lamps (228)

G-E Lamp Dept. has issued an illustrated folder on its industrial infrared lamps. This folder is issued as "Y-689."

Price Sheet (229)

Day-Brite has issued Forms OD-458, OD-459 and OD-460 covering latest price revisions on Viz-Aid, Topnotch, Day-Line, Coronado and Parkway fixtures.

Telephone (230)

Kellogg Switchboard & Supply Co. is offering a 24-page booklet on its 1,000 series Masterphone, desk-set telephone.

Transformers (231)

A booklet entitled, "4 Minutes With Pennsylvania Transformers," gives a summary of units available from the company.

Temperature Control (232)

A 4-page bulletin from the Claud S. Gordon Co. gives technical details of the Xactline straight-line temperature control.

Intercommunication (233)

The new KR-4010 intercommunication system is described in a bulletin from the Talk-A-Phone Electronic Laboratories.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

200	201	202	203	204	205	206	207
208	209	210	211	212	213	214	215
216	217	218	219	220	221	222	223
224	225	226	227	228	229	230	231
232	233						

Name..... Company*..... Title*.....

Address.....

*** Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.**

THESE FACTS SHOW *Why* . . .

G-E *Thermoplastic* BUILDING WIRE

answers your wiring needs

New Wiring · Rewiring
Maintenance Wiring

Description . . . G-E thermoplastic building wire (Types T and TW) is a small diameter wire made of highest quality materials and produced to meet rigid specifications. It can be used for all wiring requirements where permitted by local codes and is suited for widely varying service conditions.

Physical Properties . . . G-E thermoplastic building wire resists oils, acids, alkalies, and other chemicals and solvents. It is virtually unaffected by sunlight, moisture and weathering. It resists flame and will not support combustion.

Electrical . . . G-E thermoplastic building wire is high in dielectric strength and will withstand a 720-volt per mil breakdown voltage. Current carrying capacity ranges from 18 amperes for size 14, to 455 amperes for 1000000 CM (based on National Electric Code). High insulation resistance eliminates the danger of loss of power due to current leakage. Types T and TW wires can be used wherever Types R, RL, and RW are acceptable.

Insulation . . . G-E thermoplastic building wire is insulated with plasticized polyvinyl chloride compounds which give it unusual resistance to aging, abrasion, and extremes of temperature. The insulation has a hard, smooth finish.

Types . . . Types T and TW building wires are suitable for new wiring, rewiring, maintenance wiring, and special wiring. Type T is recommended where general-purpose wiring is suitable. Type TW is recommended for service in permanently wet locations.

Information . . . Ask your nearest G-E Merchandise Distributor or write to Section W3-225 for additional data on physical and chemical characteristics, sizes, typical applications, etc. General Electric Company, Appliance and Merchandise Department, Bridgeport 2, Connecticut.

GENERAL ELECTRIC

ELECTRA'S HUSBAND

The New Benevolence

"HYPATIA SIMMONS' cousin is back from England," Electra announced one evening recently. "She didn't stay nearly as long as she expected. She said she couldn't stand the hardships. You ought to hear her tell about it."

"Why did she go in the first place?" I asked. "She should have known what to expect."

"She says she didn't ever think of finding what she did," Electra continued. "The coal shortage, the food shortage, the clothing shortage, the shortage of electricity all were bad. Frequently they had to drink cold tea for breakfast. So many people used their electric range ovens—cookers, she said they called them over there—to help heat their houses, that the government set a limit on the amount of electricity that could be used. Because of the rationing of gas and electricity, there was very little hot water. She claims that life over there really is difficult."

"Do people blame the Labor government and its socialistic policies for conditions?" I inquired.

"She says that people are confused about that," Electra answered. "They have great hopes that when the government takes over the mines and the railroads and the electric companies, like they have nationalized the banks, then conditions might improve. But she also says a lot of folks are becoming increasingly doubtful of the ability of government to work miracles. In fact she brought home a clipping from one of the papers which quotes the Scottish author, Eric Linklater, on life under the so-called 'new benevolence.' He made the statement at the time Aberdeen University gave him an honorary degree. But read it for yourself; I borrowed it so you could."

She handed me a clipping from one of the English newspapers and I read what Linklater said:

"Our children, brought into the world by the state's own obstetricians, and nursed on certified milk from cows approved by government inspectors, must be educated by state subsidy in state schools until directed by the state into essential industry under the protection of government insurance against periods of unemployment and the infection of disease, of which, on application through the proper channels, they could be cured by an officer of the state medical service.

"The patient, happily recovered, and having signed his name on a great number of forms, would proceed on a publicly owned railway for a paid holiday in a communal camp in a national park and there, after listening to a stimulating lecture on the statistical analysis of state production, he would be introduced by a properly trained welfare worker to a thoroughly vaccinated and otherwise attractive young woman in the junior ranks of the civil service.

"They would decide to exchange an authorized number of bread units for a wedding cake confected to a recipe issued by the Ministry of Food, and having applied in triplicate for the necessary dockets with which to buy utility furniture for a house to be built under government contract on a municipal estate, would settle down to live happily ever after with the bride's mother."

When Electra saw that I had finished reading, she said:

"Just like the New Dealers were planning for us back before the November elections, isn't it?"

"YOU'RE supposed to be an electrical engineer," Electra challenged one Saturday afternoon recently, "now come into the bedroom and do your stuff. The new bedroom set came this morning while you were at the office and you have a job to do."

"Such as?" I said.

"Such as showing me just exactly how to connect two electric blankets, two reading lamps, an electric clock and a radio to one outlet," she said. "And besides I sometimes want to hook the sunlamp or the heating pad to the same outlet too."

(You might have guessed that we now have twin beds. You're right.)

"I'll have to take the car and drive down to the five and dime first, my dear," I said. "That is unless you have a couple of those four-way plugs in your box of trinkets under the sink."

"The last one of those is in the living room with the radio, two lamps and a clock connected to it," Electra said. "And you can't take the one in the dining room. It has a lamp, the clock and a radio connected to it.

"I'll buy some more and then pray that the fuses don't blow," I said.

"Why weren't there enough outlets put in this house in the first place?" Electra asked.

"That's easy," I said. "When this house was built nobody ever dreamed of electric blankets. One radio in a home was all anyone expected—not one in almost every room. Ceiling fixtures were supposed to do the lighting job. Sunlamps were a novelty and one electric clock to a home was plenty. The wiring is obsolete."

Ours isn't an isolated instance. In millions of homes right now the same scene might be enacted because the wiring system is totally inadequate for the scores of appliances it is supposed to serve. As a consequence wires are strung along baseboards and draped over doors in an effort to make the use of lamps and radios and clocks and heaters and blankets easy and convenient. Outlets are plugged with plugs plugged with plugs. Hazards to life and safety. Bottlenecks for greater use of electrical conveniences.

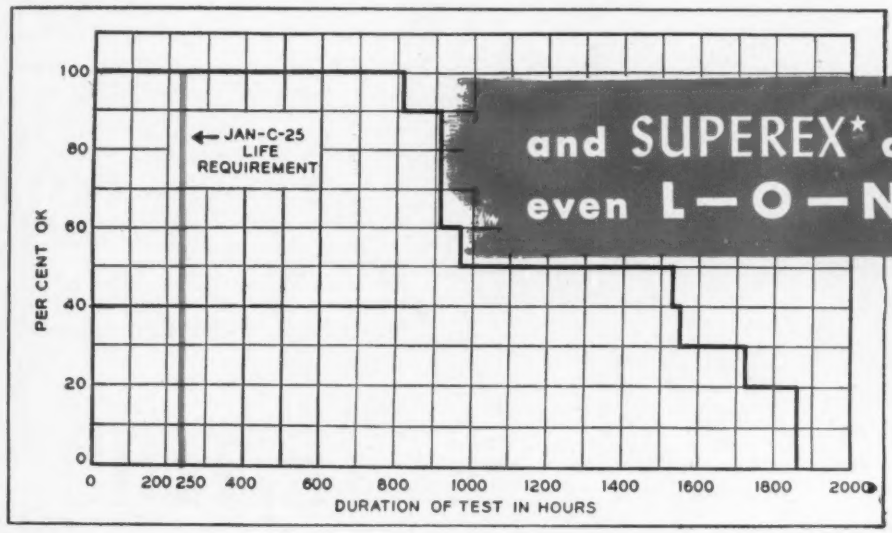
And the pity is that the electrical industry isn't doing anything about it. Except moan perhaps. And run countless newspaper ads about how cheap and convenient electricity is. Or splash full pages in national magazines telling of new and wondrous electrical devices to provide new comforts, new conveniences and new entertainment. If the customer can find a place to connect them after they are purchased.

We are waiting to hear about a truly successful plan to break the bottleneck caused by old and obsolete wiring in homes that predate the early thirties. We wonder where the initiative and originality and courage and resourcefulness is for which the electrical industry is noted. None of those qualities are being directed at the job of rewiring the homes of the millions of people who are expected to lay out good money for the new electrical gimmicks and gadgets. There are fine promotional plans for seeing that new homes are wired adequately. Even so, in the light of what has happened, we sometimes wonder if the standards of adequacy proposed for today will be capable of providing for the electrical wizardry of a decade from now.

Electra says that by then maybe we'll be taking the electricity out of the air and won't need wires. That would be one solution.

they've got to last L-O-N-G

. . . to meet Joint Army-Navy Specifications



Two-hundred-fifty hours under 1.4 times rated voltage at the high temperature of 85°C is the rigid accelerated life requirement of Joint Army-Navy specifications JAN-C-25 for fixed paper capacitors.

A typical group of Solar **SUPEREX*** capacitors – taken at random from commercial production – was placed on a life test under these severe conditions. *Not a single failure occurred before 816 hours had elapsed.*

This is not an isolated instance. Repeated tests of **SUPEREX*** capacitors, taken from the commercial production line, show the same outstanding long life.

If you need the utmost in capacitor performance and "Quality Above All", write Solar Manufacturing Corporation, 285 Madison Avenue, New York 17, N. Y.

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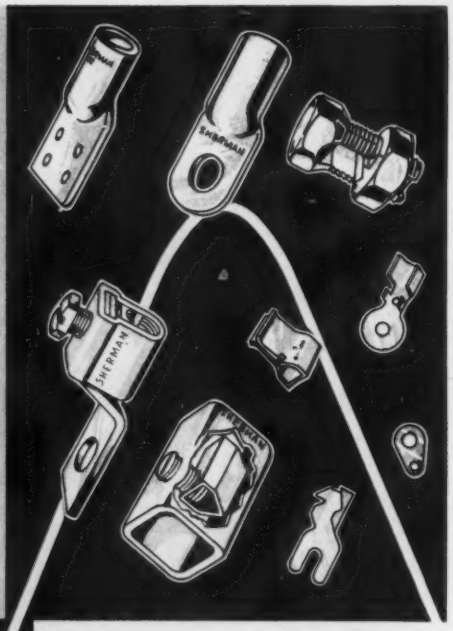

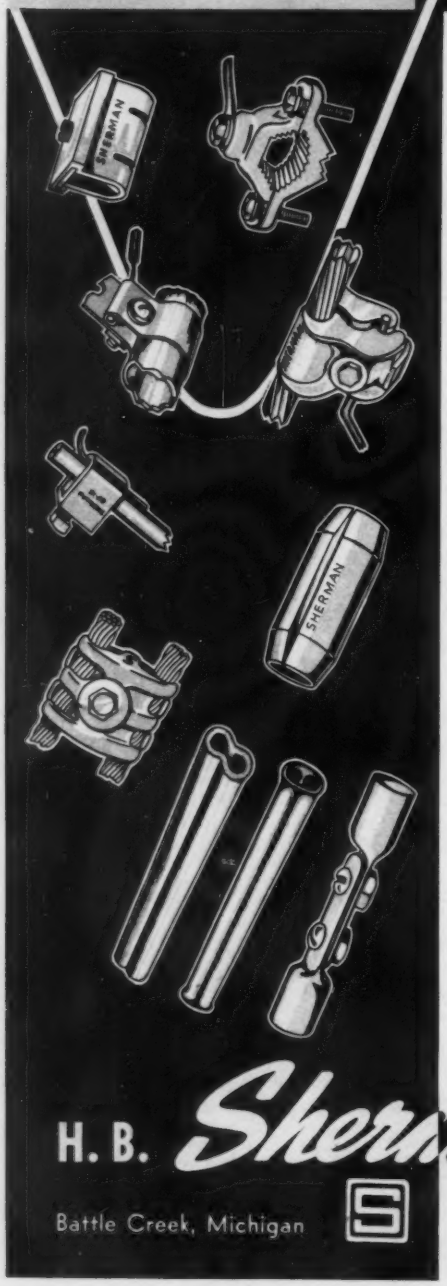

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For fifty years Sherman has specialized in the production of small copper and brass fittings. Through most of that period, Sherman production men have worked with the leading engineers of the Electrical Industry, to solve each new connector problem as it came up.

Today the Sherman line of Electrical Fittings is famous everywhere for its uniform quality and dependability. Engineers know that Sherman Connectors can be relied on to give lasting good service, under the difficult service conditions so often encountered.

Compared with other, more expensive circuit components, a connector is only a small item. Yet in service, the continued reliability of the connector becomes highly essential. For that reason, it pays to specify Sherman Connectors of time-tested quality and dependability.

H. B. Sherman Mfg. Co.
Battle Creek, Michigan

Available only through preferred Electrical Wholesalers.

BOOKS
you may want

ELECTRIC POWER EQUIPMENT, Third Edition, by J. G. Tarboux, 493 pages, 5x8, McGraw-Hill, $6.

Those familiar with this volume, which first made its appearance in 1927, will find the many new developments in the power-equipment field incorporated in the third edition. It still serves its original purpose: to give those who have had fundamental training in electrical circuits and machinery a general knowledge of the details, operation, and application of the more common electric power equipment. It is designed primarily as a text or reference for senior students in electrical engineering.

EQUITABLE LIGHT AND POWER RATES, written and published by W. R. Tingle, 60 pages, 6x9, paper bound, $1.

The author, a certified public accountant of North Carolina, has developed a scheme whereby one may set up a rate schedule which decreases uniformly with increasing consumption, instead of one which steps down in blocks. Both base rate, and the rate of change may be varied, so that the billing may be made to approximate any cost curve. The method of computing and setting up such rates is explained and illustrated.

LETTERS

To the Editor:

A slight error appeared in the article, *What Kind of Light Costs Least?* page 71, November 1946 ELECTRICAL WEST.

The error is in the last two phrases of the paragraph which read " . . . regular lamp life, 2,500 hours; Slimline and cold cathode life, 10,000 hours."

This should read: "Twenty-five hundred hour lamp life on the regular and Slimline with 10,000 hours life on cold cathode lamps." The correct designation of lamp life for the Slimline lamps, of course, appears correctly in Table 1—Light Source Comparison Sheet on page 71.

S. H. Hazelton
Illuminating Engineer
G-E Lamp Dept.

To the Editor:

We appreciate very much the reference in Mr. J. Fiske's article, on page 73 of your November 1946 issue, to our "Megger" Insulation Testing Instruments.

May we request however that in the future you refer to these as Megger Insulation Testers rather than "A Megger" or "The Megger", so as to avoid confusion with other types of insulation testers.

The word "Megger" is a trade mark.

We will appreciate very much your accepting this request.

T. Barclay Whitson
Advertising Manager
James G. Biddle Co.

FOR SAFETY'S SAKE . . . USE CONDUIT *(Full Weight Rigid Steel)*

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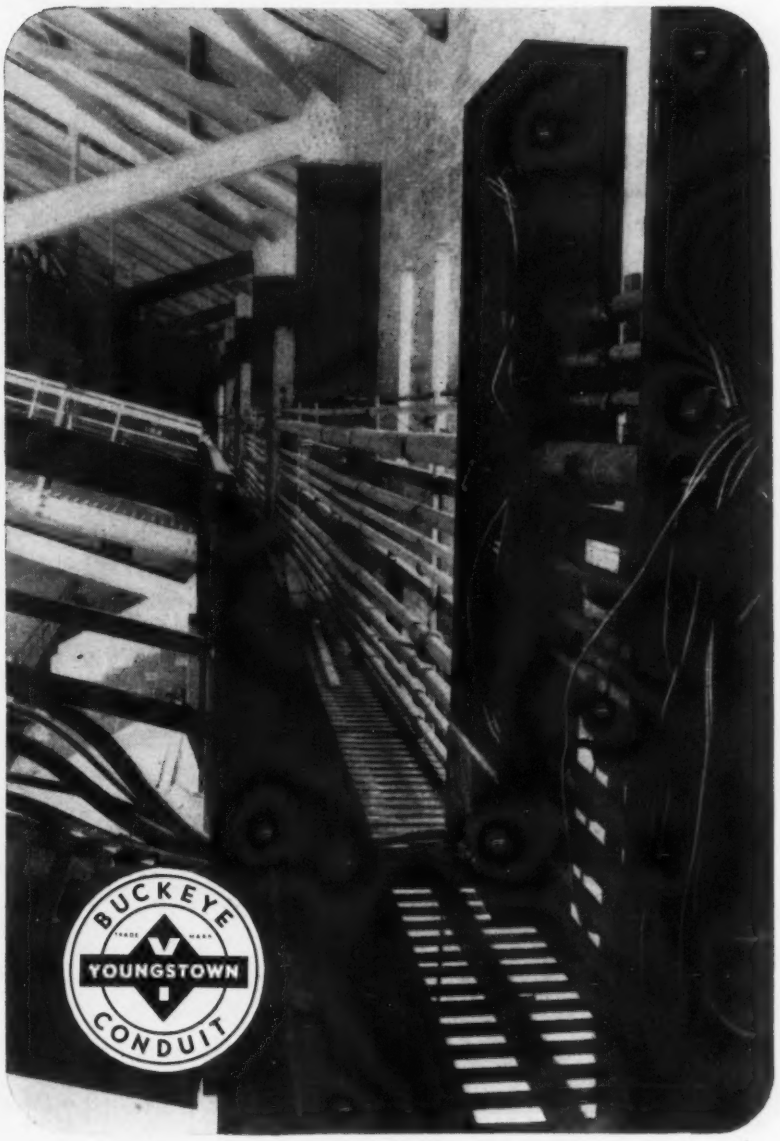
doesn't make it any SAFER



HIGH up, out of the way, why bother with conduit?

But "out of sight" didn't mean "out of mind" on this job. The hazards of dust and moisture are still present, even though the wiring seems to be out of the way. So the contractor protected the wiring with full-weight, rigid-steel conduit--further simplified his work by using pre-assembled conduit racks.

In new construction, under way now and being planned, you can give owners and tenants maximum protection by specifying and installing Youngstown "Buckeye" conduit. "Buckeye" has proved its dependability in unfailing, successful performance under all kinds of conditions, in all kinds of structures, for more than a quarter century.

In every respect, "Buckeye" full-weight, rigid-steel conduit meets the requirements of the National Electrical Code which says that for hazardous locations and occupancies, the only wiring system approved as moisture, vapor, dust and explosion proof is rigid steel conduit.

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ELECTRICAL WEST

FEBRUARY 1947
VOL. 98 NO. 2

A DYNAMIC FUTURE

Geneva Steel Co.
Subsidiary of U. S. Steel Corp.

"JUST as 1946 presented further confirmation of the fact that the Far West is the most dynamic growth area in the U. S., so will 1947, in the opinion of business leaders, continue to build on the solid foundations for great expansion laid during the war. Even as national economists predict some form of national recession during 1947, it is the concensus that the Far West is on the threshold of further sharp population gains, an unprecedented building boom, more heavy industrial construction and expansion and a marked stimulation of all types of commercial activity. Conceivably if the projected national recession is minor and brief, it may never even affect the West because of the natural time lag of economic trends from east to west.

Electrical barometers currently confirm both growth trends and the general optimism for the future. At the close of 1946 not only peak loads but energy output as well were both exceeding wartime high levels and were putting serious strains on the industry's facilities. Every branch of the electrical business was confronted with immediate demands and future backlogs which tended to belie predictions of economic trouble ahead.

All phases of the Far Western electrical industry's future are analyzed in the editorial pages which follow. Statistical comparisons will be found on the next page. Population, including resident military, now is 12.4% of the U.S. total. People, coupled with resources, are the key to the region's potential greatness. Here is how the economic development on which the electrical industry draws is set up: Western states production accounts for 43% of the lumber and 21% of the minerals of the U.S. (electrical generating capacity is 17.4% and electrical energy output 18.4% of the national total). The West accounts for 17% of the motor vehicle registrations, 13% of the retail sales, 16% of the telephones, 13% of the wholesale trade, and 8% of the manufactured products. Income of the total population in 1945 (1946 is estimated to be higher) was $22,660,000,000. Effective buying income amounted to $3,988 per family compared to $3,616 for the U.S. as a whole. Most significant is the deficiency in Western manufacturing when measured in terms of the greatly increased consumer market. One estimate gives the Western states 16% of industry's future market in the U.S.

Translated into electrical market potentials these resources and economic factors spell opportunity. The growing industrial, commercial and agricultural demands, coupled with the normal electrical requirements of the expanded population, have necessitated advance planning for more than 2,500,000 kw. of new utility generating capacity to be completed in the next three years. This, together with the associated transmission and distribution facilities, adds up to the largest utility construction expenditures in the history of the region. The 2½ million new resident population has intensified an already acute housing demand that will take three years to satisfy, with resultant assured markets for supplies and appliances. Close to a billion dollars of new industrial and commercial construction and expansions will require huge expenditures for electrical equipment. All of the elements of growth are present to make the electrical industry the most dynamic factor in the very evident "manifest destiny" of the Far West.

Table I—Comparison of National to Western Operations for 1945 and 1946

	11 Western States		United States		Per Cent West to U.S.	
	1945	1946	1945	1946	1945	1946
Energy generated (Millions of Kwh.)	41,790,820	41,039,099	222,433,981	217,766,440	18.8	18.8
Energy generated in Hydro Plants (Millions of Kwh.)	37,067,924	34,853,080	79,917,308	78,426,693	46.4	44.4
Energy generated in Fuel Plants (Millions of Kwh.)	4,722,896	6,186,019	140,436,858	139,339,747	3.4	4.4
Percentage of Hydro to Total Generated	88.7	86.3	35.9	35.0	....	....
Installed Generator Capacity (Kw.)†	8,739,116	8,704,144	49,901,280	50,195,889	17.5	17.4
Installed Hydro Generator Capacity (Kw.)†	6,317,019	6,239,508	14,884,098	14,839,508	42.4	42.0
Installed Fuel Generator Capacity (Kw.)†	2,422,107	2,464,630	35,017,182	34,242,655	6.9	7.2
Revenue from Energy Sales (Thousands of Dollars)‡	444,500	463,000	3,341,518	3,450,000	13.3	13.4

† Source—Federal Power Commission. ‡ Data from EEI. 1946 estimated.

Table II—Ten-Year Generation Record for Western Public Utilities

(Thousands of Kilowatt-hours)

	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946*
Arizona	510,483	717,825	696,787	1,327,485	1,404,299	1,459,689	2,630,936	3,198,771	3,770,667	3,435,988	3,082,684
California	10,091,716	9,632,178	9,426,519	9,403,588	9,788,869	10,383,352	11,383,154	14,776,371	15,887,456	15,943,740	16,806,029
Colorado	652,404	721,482	731,395	760,445	791,967	818,213	977,690	1,097,260	1,136,831	1,128,655	1,141,429
Idaho	796,430	972,212	992,278	1,126,518	1,175,305	1,142,341	1,244,946	1,338,183	1,233,764	1,263,032	1,311,442
Montana	1,452,390	1,319,637	1,324,151	1,575,016	1,769,124	2,177,623	2,248,133	2,597,086	2,459,781	2,318,130	2,397,165
Nevada	171,499	1,152,788	1,491,205	1,855,042	2,324,176	2,403,747	2,432,124	3,228,132	3,244,462	2,590,404	2,478,395
New Mexico	214,602	255,378	262,124	281,508	316,862	368,449	409,854	470,931	511,165	556,892	588,673
Oregon	1,250,421	1,392,177	1,253,615	1,484,468	1,739,903	2,909,772	3,651,159	4,619,280	4,785,539	4,183,748	3,921,097
Utah	418,194	507,415	340,172	425,474	577,641	564,812	604,393	619,280	436,943	416,956	447,737
Washington	2,273,148	3,734,715	3,400,683	3,642,610	3,944,184	4,499,031	6,494,920	8,926,679	10,311,897	9,689,862	8,607,274
Wyoming	114,755	131,139	139,205	141,135	184,701	217,343	243,697	290,538	255,575	263,403	304,145

* F P C reports for 12 months ending November.

Table III—Number of Utility Customers at End of 1946

	11 Western States			United States		
Class of Customer	1945	1946	Change	1945	1946	Change
Residential	3,608,315	3,859,000	250,685	28,116,998	29,743,000	1,626,002
Rural	381,210	381,000	210	1,234,441	1,360,000	125,559
Commercial and Industrial	659,172	716,300	57,128	4,560,552	4,876,300	315,778
Municipal, Railway and Miscellaneous	18,292	19,580	288	119,112	120,700	1,588
Total	4,667,989	4,975,880	307,891	34,031,073	36,100,000	2,069,927

Table IV—Type and Capacity of Utility Generators, November 1946

			Total Capacity	Generator Capacity in Kilowatts of Plants Operated by (a)					
				Water Power		Steam Power		Internal Comb. Engines	
State	Utilities	Plants	Kw.	No.	Capacity	No.	Capacity	No.	Capacity
Arizona	18	52	679,368	15	540,759	10	94,675	27	43,934
California	26	164	3,385,007	122	1,988,195	26	1,348,100	16	48,712
Colorado	41	85	332,849	30	86,585	24	228,648	31	17,616
Idaho	15	53	268,718	43	265,196	1	400	9	3,122
Montana	20	39	373,431	22	358,274	4	11,968	13	3,189
Nevada	8	15	590,157	10	586,135	..	....	5	4,022
New Mexico	23	47	177,467	8	25,090	13	127,487	28	24,890
Oregon	20	71	904,666	51	713,029	12	186,810	8	4,827
Utah	27	75	171,437	58	92,445	4	68,750	13	10,242
Washington	23	62	1,738,625	45	1,534,280	10	202,320	7	2,025
Wyoming	28	49	82,419	15	49,520	10	27,160	24	5,739
11 Western States	249	712	8,704,144	417	6,239,508	114	2,296,318	181	168,318
United States	1,653	3,858	50,195,889	1,500	14,839,584	1,049	34,242,655	1,309	1,113,659

Table V—11 Western States Regional Market Development

Item	Year	Amount	Per Cent of U. S. Total
Population	1940	13,883,265	10.54
Families	1940	4,135,440	11.86
Dwelling Units, Urban	1940	2,721,514	12.59
Dwelling Units, Rural	1940	1,820,319	11.58
Farms	1940	509,671	8.36
Crops and Livestock Value	1939	$1,512,561,000	16.59
Industry, Establishments	1939	21,000	11.67
Industry, Value of Products	1939	$4,729,155,000	8.32
Wholesale Establishments	1939	27,232	13.58
Wholesale Value of Sales	1939	$6,137,757,000	11.11
Retail Stores	1939	213,027	12.03
Retail Value of Sales	1939	$5,726,300,000	13.63
Passenger Auto Sales	1940	402,235	12.65
Effective Buying Income, Estimate (a)	1940	$9,171,281,000	12.36
Population, Resident Civilian	1945	15,281,903	11.99
Population, Resident Civilian and Military	1945	16,384,989	12.42
Retail Sales, Total Estimate	1945	$11,605,904,000	15.57
Food Store Sales	1945	$2,846,123,000	14.79
General Merchandise	1945	$1,691,921,000	14.58
Drugs	1945	$418,608,000	14.43
Wholesale Sales, Estimate	1945	$13,528,836,000	12.96
Gross Farm Income	1945	$4,916,270,000	16.86
Bank Deposit Total	1944	$13,094,809,000	12.85
Demand	1944	$7,994,022,000	12.30
Time	1944	$5,099,787,000	13.80
Motor Vehicle Registrations	1944	4,971,500	16.50
Effective Buying Income, Gross	1945	$22,658,831,000	14.75
Major War Supply-Facility Contracts and Project Orders—June 1940 Through June 1945	....	$31,131,033,000	13.13

(a) Effective buying income estimates presented throughout the Economic Survey are based on "Sales Management" reports.

SPOTLIGHTED

Production Although 1946 output from utility generating plants tapered off to 41,040 million kwh., some 9% below the wartime high, Western utilities were straining to meet demands as the year closed. In December generation was running 20% ahead of 1945. A dry year in the Pacific Southwest did not help matters. As a consequence fuel-generated power increased to 15% of the Western total.

Energy Use Industrial consumption continued to fall off during the first half of the year, being offset by gains in the residential and commercial classifications. Then the downward trend was reversed and it was a large spurt in industrial demand that began putting the strain on generating facilities from one end of the Coast to the other.

Capacity Almost insignificant was the 15,000 kw. in minor generating equipment additions during 1946. It was not sufficient to offset retirements, and installed capacity declined to 8,704,144 kw. However, beginning this year the picture will change—new facilities totaling 2,500,000 kw. are in the planning or construction stage, all to be completed by 1949.

Expenditures Material and manpower shortages held utility expenditures down in 1946. Power companies and municipal systems spent $105,000,000 on new facilities. This is exclusive of any federal power funds. Of the total, $54,000,000 went for distribution and $27,000,000 for transmission.

Budgets New facilities will require expenditures of $210,000,000 in 1947. When some $75,000,000 of federal expenditures for power production projects are added, the total is the largest budget for electrical facilities in the history of the region. Generation will take $80,000,000 of funds, as will distribution.

Customers Before 1947 proceeds very far, Western power systems will be serving five million customers. As 1946 ended the total was 4,975,880, an increase of 307,891 during the year. Residential customers increased 200,685 to a total of 2,859,000. At the rate population is expanding, this growth will be continued.

Industry Food, chemicals, metals, aircraft, forest products—in these and scores of other classifications is Western industry expanding. Iron, steel, aluminum and magnesium furnish the base for heavy industry. Names of great national organizations as well as those of hitherto unheard of companies make up the list of new plants locating in this region. Some 700 new factories with a capital investment in excess of $400,000,000 were established in California alone in 1946. And there is no apparent letup in the announcements of new and expanded factories.

Appliances A still unsatisfied demand for 120,000 ranges and an increasing ratio of electric water heaters, 90,000 at least, and from 400,000 to 500,000 refrigerators and home freezers, and relative numbers of all other household appliances, make the West with its low rates the most active market in America.

$270,000,000 All-Time High For Added Facilities in The West

DESPITE shortages of manpower and material, private and municipal systems in the eleven Western States got more than 107 million dollars of plant constructed in 1946. The indicated figure in ELECTRICAL WEST's forecast of a year ago: " . . . well over 100 million dollars."

Set up for the same purposes this year are programs aggregating 197 millions. Again, manpower and material availabilities set the limits to what can be done, but the chances appear good that this enormous undertaking will come close to accomplishment.

In the first place, the entire array of factors which determine actual construction rates are more measurable than they were a year ago. The dimensions of permanent Western growth, as distinguished from war-boom expansion, have become evident. The new magnitudes of electrical consumption likewise have been indicated by more than a year of peacetime activity. And manpower and materials, while continuing to be extremely short in certain categories and regions, are nevertheless much more predictable than they were a year ago.

In the second place, a considerable portion of the budgeted figure is identified with large programs developing on schedules laid down many months back.

In addition to this record-breaking 197-million outlay by locally operated systems, the U. S. government will spend about 75 million dollars for power facilities in the West—through REA loans, through the USBR, BPA and the Army Engineers.

As summarized in the October 1946 ELECTRICAL WEST, more than 2½ million kilowatts of new generating capacity will be installed in the eleven Far Western states by all these groups throughout the next three years. Out of this total, most 1947 deliveries (barring further delays) will be in the southern California area, where 1947 steam-unit connections are scheduled as follows: Glendale 20,000 kw., Pasadena 44,000 kw., Southern California Edison 120,000 kw., Los Angeles 69,000 kw., San Diego G&E 50,000 kw.—for a total of 303,000 kw.

The urgent need for generation is matched, however, by the need for distribution plant. Transformers continue to be the most urgently needed piece of equipment. Distribution expenditures will probably slightly exceed those for generating facilities in the utility budgets, the two items accounting for about 75% of the total. About 20% will go for transmission, and the remaining 5% for general plant.

In the following accounts, chief engineers and other executives of the private, municipal and federal systems throughout the West have set forth their 1946 accomplishments, and their 1947 plans in detail. Systems and projects will be found listed alphabetically by states.

Federal

Bureau of Reclamation

Projects are listed under the states in which they are located. A tabulation of USBR current and future generator installations appears on page 75, and transmission lines on page 74.

Bonneville

Detailed activities of the Bonneville Power Administration are reported on page 81.

REA

Although scarcity of materials continued to hamper power line construction in 1946, the Rural Electrification Administration's borrowers in the eleven Western States made substantial progress with postwar expansion programs. By the end of the year, cooperatives and other borrowers in the states west of the 100-degree meridian were operating nearly 34,000 mi. of distribution lines serving more than 100,000 farms and other rural consumers. Loans in this region totaled $23,000,000 for the year, bringing the 11-year cumulative total to more than $81,000,000. These 1946 loans will finance the addition of more than 25,000 new consumers.

Nationally, farm electrification passed the half-way point in 1946. Official REA estimates, as of July 1, 1946, showed that more than 2,700,000 farms of the U. S. were not electrified, of which 104,000* were in the eleven Western States.

An important rural electrification development of 1946 was the greatly increased farm use of electricity for power applications. This is made evident by the fact that more than 183 million kwh. were distributed over REA-financed lines in the eleven Western States last year, more than a fourfold increase of the 40 million kwh. five years earlier, although the number of consumers only doubled during that period. Status of REA-financed systems is given in the tables on pages 70 and 71.

* Less than 4%.—Ed.

Arizona

Arizona Power

We spent approximately $400,000 on new and improved facilities in 1946, and have budgeted $280,000 for the same purpose for 1947.

Construction was started in 1946 on the modernization of Childs hydro plant. New outdoor metal-clad switchgear is replacing all indoor equipment; 4,500 kva. of OISC outdoor transformers are replacing three indoor banks.

Our principal system addition was a 58-mi., 66-kv., H-Frame transmission line connecting the Winslow diesel plant with the interconnected transmission system. This line, operating initially at 44 kv., doubles the power supply in the Winslow area.

We have added 526 residential customers and 177 commercial customers during the past year.

We plan on replacing a 1,500-kva. transformer bank in Prescott with a 3,000-kva. bank. We are also constructing an 18-mi. 44-kv. line between Williams and Bellemont, in order to give duplicate service to Ash Fork, Williams, Bellemont and Flagstaff during 1947.

We either have under construction, or have plans completed for construction, of approximately 75 mi. of new distribution lines into new service areas adjoining our present areas.

We are also rehabilitating our Tapco steam plant and plan to place it in operation in March in order to carry expected increases in system load, which load has now outgrown our hydro plant capacity. — *Malcolm M. Bridgwater, general superintendent.*

Davis Dam Project, USBR

Last year saw the start of construction of Davis Dam and power house on the lower Colorado approximately 65 mi. below Boulder Dam. When completed, the Davis Dam power house will have an installed capacity of 225,000 kw. It is planned to have the power plant in operation by 1949. Construction is already under way on the transmission system.

Central Arizona L. & P.

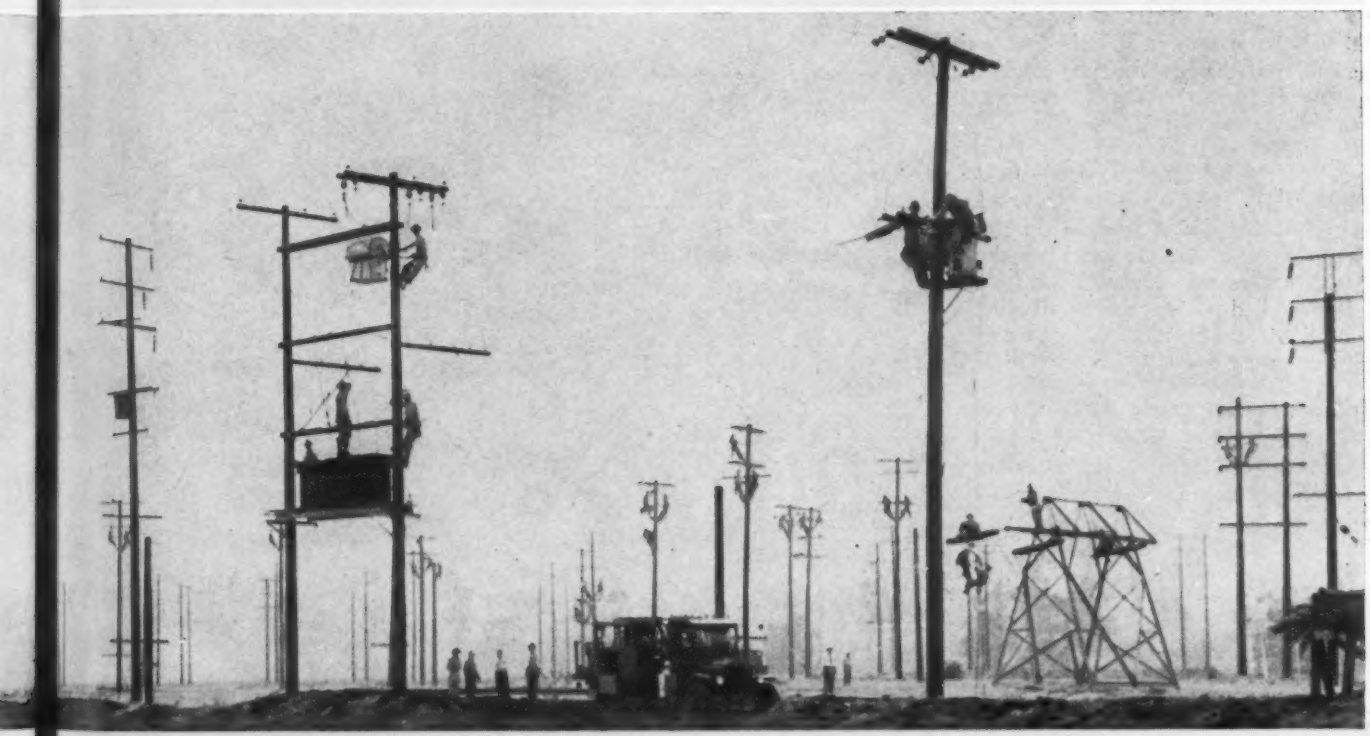
During 1946 this company spent approximately $1,315,000 in property additions. This was double the amount budgeted for the year, the principle reason being the increased building activity within our service area, and extension of facilities into rural areas. Our 1947 schedule calls for the expenditure of approximately $2,415,000.

Transmission and distribution facilities were extended into agricultural areas, Dendora Valley, Aguila, Tonopah, Wintersburg, Centennial Valley, Rainbow Valley, Cave Creek and Castle Hot Springs.

The company took over the contract for sale of power to the town of Wickenburg in Maricopa County, which was formerly supplied by the Arizona Power Co. Extension of the transmission and distribution lines to the northern part of Maricopa County has made electric service available to the greater percentage of residents in that area. More distribution substation facilities have been installed and electric line extensions made in the area surrounding Wickenburg.

Added distribution line of all voltages amounted to approximately 250 mi. An amount of $860,000 was spent for all the distribution facilities added. Reconstruction and improvements to existing facilities on account of increased loads required approximately $80,000. New 69-kv. transmission lines amounted to 40 mi. Approximately 4,100 new customers were connected and 15,000 kva. in distribution transformer capacity installed. The peak load reached the all time high of 73,000 kw.

Early in 1946 plans were started for



This year as last, there are not enough skilled linemen. Here is the 15-acre classroom of So. Cal. Edison's school

the addition of a new 30,000-kw. steam unit at the company's plant west of Phoenix. Installation of these facilities is expected to be completed about the middle of 1948 at a total expenditure of approximately $2,750,000, including building, boiler, cooling tower, deep well and auxiliary gear.

1947 Schedule

Out of the 1947 budget, $1,000,000 or more will be spent on construction work in progress for the installation of additional generating facilities.

Transmission lines to be built amount to approximately 60 mi. Substation equipment will also be added at the terminals of these several lines. Building activity is still at a high peak and undoubtedly will carry on during 1947. It is estimated that at least $500,000 will be spent on electric line extensions and there will be an increase of approximately 4,600 customers, both residential and commercial.

Peak load on the system is also estimated to exceed 90,000 kw. Approximately 15,000 kva. of transformer capacity is being added at three Phoenix distribution substations and another 12,000 kva. in transformer capacity is to be installed at the various distribution substations in the rural and agricultural areas to step down from 69 kv. to the 12-kv. distribution-system voltage. It is estimated that 1,000 distribution transformer units of 2.4-kv., 7.2-kv. and 12-kv. will be necessary, accounting for 15,000 or more kva. of added distribution transformer capacity.—*George H. Groh, chief engineer and general superintendent.*

Salt River Valley Assn.

The association's expenditures for plant in 1946 are estimated at upwards of $760,000. There is no definite program for 1947, because of uncertainty of the status of the power system; there is the possibility of its sale to the U.S.

There were no capital investments for added generation in 1946, but a 10,000-kw. mobile steam plant was leased from the Navy. Transformer additions amounted to 41,100 kva., of which 12,500 kva. was in connection with the mobile generator, 24,100 kva. in distribution substations and 4,500 kva. in rural districts. Transformer additions aggregated $525,000. Twelve miles of added and rebuilt transmission accounted for $60,000. Distribution was increased by 31 mi. of 4 kv. and 61 mi. of 11 kv., totaling $125,000. The estimated net increase in meters was 2,500, at a cost of $50,000. —*F. L. Roe, superintendent of power.*

Status of Western REA-Financed Systems

System	Cumulative Construction Allocation 12/31/46	1946 Construction Allocations	Miles Energized 12/1/46	Consumers Connected 12/1/46
ARIZONA State Totals	**$ 2,704,000**	**$1,096,000**	**670(†)**	**3,254(†)**
Stonewall E Company, Tucson	100,000	.....	113(†)	226(†)
San Carlos Irrig. & Drain. D, Coolidge	145,000	.....	117(†)	331(†)
Sulphur Spring VEC, Wilcox	1,038,000	.....	334	1,690
Littlefield ECI, Littlefield	20,000	.....	(*)	(*)
Ma-Yu EC, Buckeye	790,000	485,000	(*)	(*)
Graham Co. EC, Pima	295,000	295,000	106(†)	1,007(†)
White Mountain EC, Lakeside	56,000	56,000	(*)	(*)
Verde EC, Cottonwood	260,000	260,000	(*)	(*)
CALIFORNIA State Totals	**$ 2,917,000**	**$ 515,000**	**1,625(†)**	**4,855(†)**
Imperial Irrig. D, Imperial	700,000	.....	700(†)	2,153(†)
Surprise V E'n Corp., Alturas	788,000	.....	520(†)	1,230(†)
Plumas-Sierra REC, Portola	442,000	50,000	300	798
Mountain Empire EC, Campo	227,000	.....	105	674
Bard Laguna EC, Bard	25,000	.....	(*)	(*)
Mesa EC, Phelan	495,000	225,000	(*)	(*)
Klamath River EC, Hornbrook	240,000	240,000	(*)	(*)
COLORADO State Totals	**$17,037,051**	**$3,857,500**	**8,117**	**25,578**
Grand VRP Lines, Grand Junction	571,000	148,000	367	1,674
San Luis VREC, Monte Vista	1,074,000	288,000	550(†)	1,262(†)
Morgan Co. RE Assn., Fort Morgan	1,630,000	540,000	650	1,326
Intermountain RE Assn., Littleton	1,519,000	343,000	841(†)	2,626(†)
Southeast Colorado P Assn., La Junta	2,073,810	372,000	1,200(†)	3,826(†)
Gunnison Co. E Assn., Crested Butte	335,000	.....	123	426
Delta Montrose RP Lines Assn., Delta	578,000	.....	530(†)	1,492(†)
Union RE Assn., Brighton	1,006,000	393,000	513(†)	1,603(†)
San Isabel E Assn., Pueblo	260,000	.....	183	652
San Miguel P Assn., Nucla	251,000	.....	135	658
High Line E Assn., Holyoke	1,825,000	.....	1,039	2,044
Poudre VRE Assn., Fort Collins	876,000	.....	744	1,910
La Plata E Assn., Durango	280,000	.....	260	770
Empire E Assn., Cortez	805,000	190,000	130(†)	1,837(†)
Holy Cross E Assn., Eagle	470,000	.....	152(†)	663(†)
Sangre De Cristo E Assn., Salida	454,000	82,000	130(†)	555(†)
Yampa VE Assn., Steamboat Springs	556,000	386,000	195	320
Mountain View E Assn., Limon	1,675,000	421,000	336	1,271
Y-W Electric Assn., Yuma	350,000	350,000	(*)	(*)
White River E Assn., Meeker	344,500	344,500	10(†)	469(†)
Monument E Company, Trinidad(§)	103,741	.....	29	194
IDAHO State Totals	**$ 6,222,250**	**$1,643,000**	**3,324**	**8,514**
Northern Idaho RE Rehabil. Assn., Sandpoint	1,264,750	265,000	594	1,450
Clearwater VL & P Assn., Lewiston	2,048,000	590,000	1,247	2,867
Kootenai RE Assn., Coeur D' Alene	686,000	360,000	348	1,506
Long VPC, Donnelly	341,000(‡)	.....	165(†)	420(†)
Idaho Co. L & PC Assn., Grangeville	515,000	183,000	309	594
Raft River REC, Malta	406,000	.....	135(†)	288(†)
Fall River REC, Ashton	540,000	200,000	309	730
Lost River EC, Mackay	259,000	45,000	100(†)	524(†)
Prairie PC, Fairfield	162,000	.....	117	135
MONTANA State Totals	**$14,190,798**	**$6,366,000**	**4,085**	**12,372**
Ravalli Co. EC, Corvallis	253,700	.....	252(†)	612(†)
Sun River EC, Fairfield	1,445,000	682,000	635(†)	1,276(†)
Lower Yellowstone RE Assn., Sidney	396,600	220,000	187	567
Yellowstone VEC, Huntley	903,498	380,000	473	1,568
Vigilante EC, Dillon	950,000	.....	432(†)	997(†)
Missoula EC, Missoula	495,000	198,000	253	505
Flathead EC, Kalispell	405,000	.....	210(†)	771(†)
Fergus EC, Lewistown	903,000	420,000	511	759
Park EC, Livingston	725,000	360,000	101	374
Mid-Yellowstone EC, Hysham	285,000	45,000	144	427
Beartooth EC, Red Lodge	827,000	210,000	404	837
Big Horn Co. EC, Lodge Grass	442,000	50,000	270	629
Big Flat EC, Turner	319,000	25,000	(*)	(*)
Sheridan Co. EC, Westby	500,000	50,000	(*)	(*)
Northern EC, Opheim	555,000	115,000	6(†)	80(†)
Valley Co. EC, Glasgow	470,000	275,000	(*)	(*)
McCone Co. EC, Circle	550,000	.....	4	185
Goldenwest EC, Wibaux	430,000	.....	(*)	(*)
Glacier Co. EC, Cut Bank	881,000	881,000	116(†)	1,501
Marias River EC, Shelby	1,355,000	1,355,000	124(†)	1,284(†)
Hill Co. EC, Havre	1,100,000	1,100,000	(*)	(*)
NEVADA State Totals	**$ 286,000**	.....	**142**	**603**
Alamo PD No. 3, Pioche	69,000	.....	21	66
Overton PD No. 5, Overton	217,000	.....	121	537

System	Cumulative Construction Allocation 12/31/46	1946 Construction Allocations	Miles Energized 12/1/46	Consumers Connected 12/1/46
NEW MEXICO State Totals	**$ 6,411,500**	**$2,085,000**	**1,960**	**6,181**
Central VEC, Artesia	786,000	365,000	270	810
Roosevelt Co. EC, Portales	1,207,000	520,000	260	961
Farmers' EC, Clovis	1,390,000	490,000	639	1,534
Kit Carson EC, Taos	1,140,000	710,000	63(†)	761(†)
Otero Co. EC, Cloudcraft	676,000	.....	177	398
Stonewall E Company, Albuquerque	224,500	.....	329(†)	650(†)
Mora-San Miguel EC, Las Vegas	273,000	.....	145	167
Sierra EC, Hillsboro	150,000	.....	3	64
Springer EC, Springer	205,000	.....	(*)	(*)
The Socorro EC, Socorro	360,000	.....	74(†)	836(†)
OREGON State Totals	**$ 9,654,084**	**$1,700,000**	**3,607**	**12,353**
Blachly-Lane Co. CE Assn., Blachly	307,000	.....	133(†)	647(†)
Benton-Lincoln EC, Corvallis	1,905,000	870,000	786(†)	2,259(†)
Umatilla EC Assn., Hermiston	333,000	40,000	271(†)	866(†)
Malheur CE Assn., Vale	375,000	.....	330	550
Douglas EC, Roseburg	964,500	90,000	401	1,398
Lane Co. EC, Eugene	1,158,000	100,000	320(†)	1,963(†)
Jordan VEC, Jordan Valley	27,584(‡)	.....	4(†)	91(†)
Coos EC, Coquille	970,000	.....	242(†)	1,196(†)
Northeast Clackamas Co. EC, Sandy	464,000	290,000	108	380
Tillamook UD, Tillamook	195,000	95,000	(*)	(*)
Central EC, Redmond	421,000	.....	390	860
Wasco EC, The Dalles	1,040,000	.....	364	646
Columbia Basin EC, Heppner	510,000	.....	(*)	(*)
West Oregon EC, Vernonia	769,000	.....	258	1,497
Eastern Oregon EC, Weston	215,000	215,000	(*)	(*)
UTAH State Totals	**$ 2,120,000**	**$ 514,000**	**910**	**2,785**
Garkane P Assn., Richfield	771,000	125,000	322	1,310
Moon Lake E Assn., Mt. Emmons	1,036,000	365,000	480	1,290
Beaver VE Assn., Beaver City	120,000	.....	13(†)	45(†)
Escalante VE Assn., Newcastle	124,000	24,000	67	88
Flowell E Assn., Fillmore	31,000	.....	28(†)	52(†)
Dixie REC, St. George	38,000	.....	(*)	(*)
WASHINGTON State Totals	**$12,864,611**	**$2,566,000**	**6,711(†)**	**16,710(†)**
Benton RE Assn., Prosser	939,500	350,000	479(†)	1,427(†)
Orcas P & L Company, Eastsound	672,000	196,000	119	841
Mutual P & L Assn., North Bend	37,919	15,000	15(†)	45(†)
PUD No. 1 of Klickitat Co., White Salmon	870,000	320,000	88(†)	370(†)
Inland Empire RE, Spokane	2,825,000	200,000	2,450	4,458
Columbia Co. RE Assn., Dayton	681,000	330,000	400	652
Quinault L Company, Quinault	82,000	.....	24	185
PUD No. 1, Chehalis	409,000	.....	322	1,635
PUD No. 1 of Kittitas Co., Ellensburg	246,000	35,000	182(†)	344(†)
Stevens Co. EC, Colville	778,000	110,000	560	1,316
Chelan Co. EC, Leavenworth	106,000	.....	49(†)	156(†)
Okanogan Co. EC, Winthrop	170,000	.....	121(†)	413(†)
Pend Oreille EC, Newport	461,000	130,000	297(†)	593(†)
Big Bend EC, Ritzville	727,000	215,000	485	445
Lincoln EC, Davenport	1,129,000	87,000	709(†)	696(†)
Nespelem VEC, Nespelem	351,000	245,000	59	438
PUD No. 1 of Clallam Co., Sequim	553,000	.....	23(†)	431(†)
PUD No. 1 of Cowlitz Co., Longview	201,192(‡)	.....	185(†)	680(†)
PUD No. 2 of Grant Co., Soaplake	359,000	.....	24(†)	743(†)
Ferry Co. PUD No. 1, Republic	510,000	90,000	60(†)	352(†)
PUD No. 1 of Douglas Co., Waterville	704,000	180,000	60	490
Mason Co. PUD No. 1, Shelton	63,000	63,000	(*)	(*)
WYOMING State Totals	**$ 7,236,600**	**$3,271,600**	**2,667(†)**	**6,826(†)**
Riverton VE Assn., Riverton	357,000	86,000	296	599
Big Horn RE Company, Basin	638,000	237,000	432(†)	1,060(†)
Wyrulec Company, Lingle	824,600	367,600	318(†)	1,011(†)
Bridger VE Assn., Mountain View	287,000	115,000	121(†)	370(†)
Wheatland RE Assn., Wheatland	470,000	260,000	102(†)	282(†)
Lower VP & L, Freedom	599,500	178,000	224	910
Garland L & P Company, Powell	112,300	40,000	70	211
Washakie RE Company, Worland	56,500	.....	63	178
RE Company, Pine Bluffs	1,506,000	540,000	601(†)	1,256(†)
Hot Spring Co. RE Assn., Thermopolis	185,000	60,000	31(†)	62(†)
Carbon P & LI, Saratoga	364,000	.....	116(†)	481(†)
Shoshone River PI, Cody	262,000	112,000	128	178
Sheridan-Johnson RE Assn., Sheridan	220,000	.....	(*)	(*)
Niobrara E Assn., Lusk	421,000	421,000	(*)	(*)
Tri-County E Assn., Sundance	855,000	855,000	(*)	(*)
Sheridan Suburban E Company, Sheridan(§)	78,700	.....	165(†)	228(†)

(*) Not Energized. (†) Estimate. (‡) Loan Repaid. (§) Formerly Stonewall Electric Company.

ABBREBIATIONS IN NAMES

C—Cooperative
Co.—County
D—District
E—Electric
E'n—Electrification
I—Incorporated
L—Light
P—Power
R—Rural
U—Utility
V—Valley

California

Anaheim L. & W. Dept.

Last year's expenditures were about $30,000 and this year's will be about $10,000, the difference being due principally to the construction, in 1946, of 2 mi. of 11-kv. line. Last year we added 550 kw. in transformers, 0.2 mi. of 2,500-volt line and 285 meters. This year we expect the first units of G-E Co.'s new Glyptol plant to be put in operation. We expect to operate the above mentioned 11-kv. at design voltage in the near future—it was built to serve a 3,000-kva. unit substation to be installed in an industrial tract—*V. W. Hannum, superintendent.*

Burbank

The 1946 expenditure for new and improved electrical facilities was approximately $170,000. Because little construction could be accomplished during the war years, we now have a large backlog necessary to re-establish system reserves and restore our system to its prewar operating level. On several projects construction is now underway; other projects are in various stages of engineering. This program calls for an expenditure of approximately $2,800,000, and will require several years for completion, principally because of difficulties in obtaining materials.

The present capacity of our steam plant will be doubled by the addition of a third generating unit of 20,000 kw., which is expected to be installed in 1948. Our present generating capacity consists of two 10,000-kw. units. In cooperation with a smoke abatement program in this area, we installed automatic smoke detectors in each stack of the plant.

The greatest portion of expenditures made last year was for distribution plant facilities and for new consumer substations. A total of 165 transformers with an aggregate capacity of 2,726 kva. was added to the system. Approximately 4 mi. of 4.3-kv. distribution lines, exclusive of feeder circuits, were built. One 4.3-kv. distribution feeder and approximately 1,340 electric meters were added.

A new 34.5/4.3-kv. distribution substation of 20,000-kva. capacity is being planned to be energized late in the fall of 1947. In addition to usual consumers, this station will also serve a proposed 1,800-hp. water pumping station which constitutes part of the expansion program of the Water Bureau of this department.

The larger aircraft plants are oper-

ating at reduced loads; however, nearly all of the war plants which have closed have been reopened by new industries of highly diversified character. These new industrial loads, together with new commercial loads, are largely offsetting the loss of war plant load.

Deliveries of equipment have not kept pace with the demands for new loads. The most critical items have been transformers, meters and wire. Although there have been no lengthy delays in supplying service, it has been necessary to establish a system of priority for serving new consumers.

Although a large part of our total load during the war was due to the aircraft industry, present system peak demand is very near our wartime peak. We have experienced a reduction in kilowatt-hours, but the decrease is much less than was expected.—*J. H. McCambridge, general manager.*

California Electric Power

The California Electric Power Co. undertook in 1946 a program which consisted of authorized construction amounting to $2,690,000. The construction budget for 1947 amounts to $2,550,000.

The 1946 program included the installation of 21,000 kva. in substation transformers, 16,100 kva. of line transformers, 5 mi. of 66-kv. line, 10.5 mi. of 33-kv. line and 126 mi. of lower voltage lines. Net increase in number of customers during the year was 4,346.

Budgeted for 1947 are 21,000 kva. in transmission substation transformers, 18,900 kva. in distribution substation capacity and 18,000 kva. in line type transformers. The contemplated construction program also contains 64 mi. of 33-kv. line and 238 mi. of lower voltage circuits.—*R. H. Halpenny, chief engineer.*

Coast Counties G. & E.

Expenditures for new and improved facilities, largely to serve new customers, amounted to $500,000 for 1946. It is estimated that expenditures for 1947 for like services will approximate $1,000,000. This increase will be due largely to a carry over of projects started in 1946 which, because of delayed deliveries of material, could not be completed until 1947.

Approximately 55 mi. of distribution line were built in 1946 with a net gain of about 2,000 meters. Our plans for 1947 include the completion of a 12-mi. unit of 110-kv. line and substation, approximately 3 mi. of 22-kv. line, 60 mi. of 4-kv. line and 10 mi. of 12-kv line, an increase of approximately 15% in both customers and load in the coming year.—*A. E. Strong, general superintendent.*

Central Valley Project, USBR

During 1946 preparatory work started for permanent installation of two 75,000-kva. transformers at the Shasta Dam power house. During the war these two generators were loaned to Grand Coulee because Shasta was not ready for their installation. Construction was considerably advanced during the year on irrigation features of the 500-mi. Central Valley project. Installation of generators in the power plant at Keswick Dam is expected to be completed in 1947.

Glendale P. S. Dept.

Construction on our distribution system during 1946 has been mostly confined to rehabilitation of lines which have passed their economic life. During the war, work of this character was postponed wherever possible, and we are now trying to catch up. Demands for new services and increase in size of loads have required a net addition of 2,000 kva. in distribution transformers during the year, partially due to new housing and partially due to industrial growth. The increase of

Even in the busiest year maintenance must go on; San Diego G&E men wash hot 12- and 33-kv. insulators, using 400 psi.

Mobile 3,000-kva. substation fills in on San Diego system as transformers are changed in permanent 12/4.16-kv. sub

Reconversion was the keynote of early 1946; for many utilities it was more than an economic difficulty. A "concrete" example was removal of bomb protection revetments around San Diego G&E's 115/66-kv. Mission substation north of city

electric meters on our system for the year was approximately 900.

During the year a second 10,000-kva. bank of transformers was installed in one of our 35,500/4,150-volt substations. This bank replaced a smaller bank which is to be used to serve pumps on our water system.

Installation was started late in 1946 on a 200,000-lb./hr. boiler to serve our second turbogenerator unit, and at the end of the year it was nearly completed. The 20,000-kw. turbine itself is due for delivery in March 1947, and work is well along on the foundation for it. Some installation work has been done on the circulating water piping for the unit. This turbine is due to go into service in the fall of 1947 and will give us a generating capacity then of 40,000 kw.

Increase of our peak load during 1946 averaged 21.4% over peak demands for 1945. Kilowatt-hours distributed during 1946 increased 12.4% over 1945. It is anticipated that our load will continue to increase during 1947 probably at a rate somewhat less than during 1946. As more material and men become available, we will accelerate our improvement program on our distribution system. Plans are now being completed to start installation of 4,150-volt feeders underground to relieve congested overhead lines. The first of this work will be on the feeders leaving the substation and in part of the heavily loaded commercial district. It is also planned to install approximately 12,500 ft. of our 34,500-volt transmission lines underground during 1947. Some rerouting and rebuilding of our transmission and distribution lines will be done during the year in preparation for the installation early in 1948 of a 12,000-kva. unit distribution substation in the south part of the city.—*P. Diederich, chief engineer and general manager.*

Imperial Irrigation District

Last year Imperial Irrigation District added 10,000 kva. of transformer capacity, 10 mi. of 34.5-kv. transmission, and distribution as follows: 20 mi. of 4-kv., 15 mi. of 7.2/12-kv. and 10 mi. of 16.5-kv., all figures approximate. Number of meters increased by 650, and connected load by about 5,000 hp.

As far as generation is concerned, our 1947 program extends into succeeding years. A 20,000-kw. steam plant is scheduled for operation in the summer of 1948, and an additional 10,000-kw. hydro unit for early 1949.

Additions to transformer capacity in 1947 are scheduled at 87,000 kva. Other parts of the program include, approximately, 20 mi. of 34.5-kv. transmission, 25 mi. of 7.2/12-kv. distribution, 15 mi. of 4-kv. distribution and 10 mi. of 16.5-kv. distribution.

This year we expect to add 750 meters and 8,500 hp. of connected load.—*N. Pike, chief electrical engineer.*

Los Angeles Dept. of W. & P.

The 1945-46 budget for new and improved electrical facilities of the Los Angeles Department of Water and Power was $17,375,000, and the 1946-47 budget is $21,188,000. Construction progress during 1946 was considerably impeded by lack of materials.

Last year's program saw no additions to generating capacity. Added transformer capacity was as follows:

Receiving Stations	0
Distribution Stations	26,000 kva.
Industrial Stations	8,150 kva.
Commercial Stations	2,950 kva.
Industrial Lines	12,927 kva.
Commercial Lines	41,248 kva.

No transmission lines were added last year. Distribution lines were added as follows:

138-kv. overhead	14.4* mi.
34.5-kv. overhead	4.3 mi.
4.8-kv. overhead	97.0 mi.
138-kv. underground	0.7 mi.
34.5-kv. underground	0.4 mi.
4.8-kv. underground	83.5 mi.

*Tie-line of two circuits.

The year was characterized by long delays in receipt of equipment on order. It is expected that main equipment will require three years for delivery. The labor situation, especially in skilled crafts, remains tight.

1947 Plans

A second main unit, of 69,000 kw., and a house unit, are scheduled for addition to Harbor steam plant this year; also, equipment is being ordered for units 3, 4 and 5. A 2.5-mi. 138-kv. underground line will be installed to connect unit No. 2 with Receiving Station C. Planned additions in transformer capacity are:

Receiving Station F	60,000 kva.
Distribution Stations	35,000 kva.
Industrial Stations	17,500 kva.
Commercial Stations	3,000 kva.
Industrial Lines	15,000 kva.
Commercial Lines	50,000 kva.

In addition to the transmission underground mentioned above, a second connection between Stations B and D is to be made. Classified as distribution, this will be 5.6 mi. of 138-kv. underground. Other distribution additions will be: 34.5 kv., 11.0 mi. of overhead and 19.8 mi. of underground; 4.8 kv., 120.0 mi. of overhead and 90.0 mi. of underground.

Load increases are expected to be on the order of 45,000 hp. in power services and 45,000 kw. in major appliance load. Customer increases are expected to be of the order of 13,000.

Preparations for three-year specifications and contracts are being made as follows: Units 3, 4 and 5 at Harbor steam plant, bus reactors at receiving

stations, rebuilt and new oil circuit breakers, new transformer banks and synchronous condensers at Receiving Stations A, F and D.—*C. P. Garman, chief electrical engineer and deputy general manager.*

Pacific Gas and Electric

With the cessation of the war and the improvement in the manpower and material situations a year ago, it was anticipated that 1946 would be a year of considerably increased construction activity. This has proven to be true, with a total of some $34,000,000 expended for new generating facilities, transmission extensions and improvements and extensions of the distribution system. The major items of the program are given below under appropriate subdivisions. For 1947, a total of $55,000,000 has been estimated for similar purposes. As in 1946, the accomplishments for next year will be very dependent upon the availability of manpower and materials.

The year will be the second in a three-year construction program which will involve a total expenditure of $160,000,000 for the expansion and modernization of the company's facilities in all categories. Only through such a vigorous program will it be possible to dispose of the volume of construction which had of necessity, to be deferred during the war years, coupled with the unusually high growth of load which the company has experienced during the past year.

Generation

During 1946, construction work was started on the new Kern steam plant of 60,000-kw. capacity, near Bakersfield. This is scheduled for completion in June 1948. Design work was also started for the installation of two 100,000-kw. turbine-generators in an extension of Station P, San Francisco. The completion of this addition is controlled by the deliveries of major equipment now on order.

In the hydroelectric field design work was in progress for the reconstruction of two of the company's oldest plants. Construction will be started early in 1947 on a new Electra plant to replace the old plant which has been in continuous service since 1902. Seven old hydraulic units, totaling 27,000 hp., will be supplanted by three new units, totaling 105,500 hp. Design work for the reconstruction of the old Colgate plant, involving the replacement of seven small units with one 25,000-kw. unit, is also in progress. These two plants will total $18,850,000.

Plans are being made for the erection of a 15,000-kw. plant, at West Point between Tiger Creek and the Electra plant, on the Mokelumne River. A 14,000-ft. pressure tunnel will be constructed with its intake at the afterbay of the Tiger Creek plant. The cost of this is placed at $4,000,000. Field construction will start in the middle of 1947, with completion scheduled late in 1948.

Other items of hydraulic construction embrace radial gates for the Salt Springs Dam to increase the storage capacity by 9,400 acre-ft. The increased storage will be utilized not only through the Salt Springs and Tiger Creek plants, but also through the proposed West Point plant and the reconstructed Electra plant—a striking example of the complete utilization of a stream.

Another plan calls for the construction of a forebay reservoir above the Pit No. 1 intake, to improve the peaking characteristics of the plant.

Transmission

During the year, 245 mi. of transmission lines of more than 50 kv. were constructed. For 1947, it is estimated that 280 mi. of such transmission will be required. The greater part of this will be at 220 kv. The increases in generating capacity programmed for 1947 and 1948 imply the following major transmission improvements, to effect the distribution of the new energy throughout the system. The San Joaquin-West Side line, 210 mi. in length, will tie the switching center at Tesla, near Tracy, with the Midway substation, carrying an augmented supply into the southern end of the San Joaquin Valley. A new 220-kv. tower line will bring power from the north to the load centers in the Bay region. A 50-mi. high-voltage tie will connect Vaca-Dixon substation with the new Moraga substation, east of Berkeley.

At the northern end of the system 106 mi. of 110-kv. transmission between Cottonwood and Eureka is now in progress, as a supporting source of power, supplementing the steam generated energy from Station B, Eureka.

In addition to the overhead transmissions, there are several in the underground category. Some 18 circuit miles of high-tension gas-filled type cable, costing $2,865,000 will connect Station P, San Francisco, with two major substations in the San Francisco area. These will be three single conductors in a single steel duct.

Although 210,000 kva. of installed capacity were put into service in 1946, it is anticipated that this figure will be

Current and Future Transmission Lines on Bureau of Reclamation Projects

Project	State	Designation of Line	Voltage in kv.
Boise	Idaho	"C" Line pumping plant to Black Canyon power plant	69
Boulder Canyon	Nevada	Nevada State switchyard to Boulder City substation	69
Central Valley	California	Contra Costa substation to Clayton and Ignecio pumping plants	69
Central Valley	California	Oroville to Sacramento	230
Central Valley	California	Shasta to Keswick	13.8
Colorado-Big Thompson	Colorado	Brush to Sterling	115
Colorado-Big Thompson	Colorado	Granby pumping power supply	69
Colorado-Big Thompson	Colorado	Sterling to Holyoke	69
Colorado-Big Thompson	Colorado	Troublesome substation to Kremmling	13.8
Columbia Basin	Washington	Pasco pumping power supply	13.8
Davis Dam	Arizona	Parker to Gene	230
Davis Dam	Arizona	2nd Phoenix to Tucson	115
Davis Dam	Arizona	Davis to Parker (1st line)	230
Davis Dam	Arizona	Davis to Parker (2nd line)	230
Davis Dam	Arizona	Boulder-Kingman line to Davis	69
Davis Dam	Arizona	Second Parker-Blaisdell	161
Davis Dam	Arizona	Phoenix to Prescott	115
Davis Dam	Arizona	Tucson-Deming interconnection Tucson-Benson section	115
Davis Dam	Arizona	Gila substation to Arizona Edison Co.'s Yuma substation	34.5
Fort Peck	Montana	Fort Peck to Williston	115
Fort Peck	Montana	Glendive to Miles City	115
Fort Peck	Montana	Fallon pumping power supply	57
Fort Peck	Montana	Fallon Relift pumping power supply	57
Fort Peck	Montana	Northern Electric Co-op. line	34.5
Fort Peck	Montana	Savage pumping power supply	57
Hungry Horse	Montana	Government Camp	13.8
Kendrick	Wyoming	Seminoe to Casper	115
Kendrick	Wyoming	Medicine Bow to Sinclair	34.5
Missouri Basin	Wyoming	Construction power	34.5
Missouri Basin	Montana	Williston to Garrison	115
Missouri Basin	Wyoming-Nebraska	Gering to Northport to Sidney	115
Rio Grande	New Mexico	Alamagordo Air Base to Hollywood	115
Rio Grande	New Mexico	Elephant Butte to Socorro	115
Shoshone	Wyoming	Heart Mountain to Garland	69
Yakima	Washington	Roze Division pumping power supply	34.5

increased to 530,000 kva. for 1947. Of leading interest is the new Mission substation now being designed, to be constructed at Eighth and Mission Streets, San Francisco, at an estimated cost of $4,800,000. This is a typical metropolitan distribution center of the indoor type. The growth of load in downtown San Francisco has been so continuous and rapid as to call for its completion at the earliest possible date in 1948.

During 1946, the Moraga substation has been under construction. This station lowers the voltage of the incoming lines from 230 kv. to 115 kv., and will serve as an inlet to the East Bay area, where a continuous growth of load has been experienced. The estimated cost of this installation is in excess of $3,300,000.

Two other important substations at Midway and Tesla will control the delivery of power from the north into the southern portion of the San Joaquin Valley. These are now under design, in preparation for a start of construction in the summer of 1947, at a combined cost estimated at $4,000,000.

Distribution

An estimated increase of 56,000 customers during 1946 is ample explanation for the steps being taken to augment the distribution facilities of the system. The year 1946 opened with a considerable volume of extension work which had been held to a minimum during the war years. During the year, 2,470 mi. of distribution lines were added.

For the year 1947 plans now call for the construction of 4,335 mi. of such lines, scattered throughout the system. The problem of procurement of materials remains, despite early ordering in anticipation of requirements. Some 25,000 distribution transformers per year are now needed to keep abreast of growth of load, and other materials are in proportion. Shortage of manpower and field transportation equipment remains a handicap—*I. C. Steele, chief engineer.*

Pasadena L. & P. Dept.

During 1946, $104,000 was spent for additions and betterments. We have set up in our budget for the current year $2,200,000 for replacements and expansion. It has of course been impossible for utilities to make the necessary replacements and installation of new equipment during the war years. The above estimate for 1947 may be modified because of deferred delivery of many major items of equipment, in which event expenditures will be deferred until 1948.

The work during 1946 consisted principally of engineering and planning. We have done very little in the way of replacement or expansion except in distribution transformer capacity and this has been minor. The number of customers meters has increased during the past year from 34,076 to 34,524.

Plans for 1947 and 1948 include a major addition to generating capacity, increased transformer capacities to be installed at three substations and installation of two new unit substations.

Generating capacity will be increased by 44,000 kw. Substation transformer capacity will be increased by 16,000 kva. Unit substation capacity added, 7,000 kva. Certain extension of distribution system will be made to take care of recent annexations to city. No changes are anticipated in transmission facilities at this time.

We estimate the kilowatt-hour load during the next year to increase approximately 15%, and system demand about 20%.

As is evident in the above brief summary, we are faced with practically the same type of problems experienced by other utilities on the West Coast. We do not see any indication of drop-off in load during the next several years.—*E. L. Bettannier, general manager and chief engineer.*

City of Palo Alto

During 1946 our peak demand increased 9.8%, consumption increased 14.4%, and number of customers increased 5.3%. About 3 mi. of new 4-kv. distribution lines were built.

It is difficult to predict the load growth for 1947, but we have every reason to expect that it will be at least as large as that during 1946.

Our 1947 construction program includes an estimated 5 mi. of overhead 4-kv. distribution and 1.7 mi. of underground. We are planning to modernize our substation with completely automatic metal-clad switchgear and feeder reactors. We will also change our feeders leaving the station from overhead to underground for approximately 1,000 ft. The substation program is to tie in with the future enlarging of the PG and E Co.'s supply facilities.

Our lighting program will include modern lighting on 1¼ mi. of residential through streets and on approximately 1 mi. of downtown business streets. We are also planning modern lighting for our baseball field.—*C. G. Smith, electrical engineer.*

Current and Future Power Development on Bureau of Reclamation Projects

Name of Project	State	River	Purpose (1)	Name of Plant	Year Initial Operation	Initial kw.	Present No. of Units	Ultimate kw.	Ultimate No. of Units
Boise	Idaho	So. Fork Boise	F.C., Irr., P.	Anderson Ranch	1948	27,000(3)	2	40,500(4)	3
Boise	Idaho	Snake	F.C., Irr., P.	Palisades	Indefinite	(2)	(2)	30,000(2)	(2)
Boulder Canyon	Ariz.-Nev.	Colorado	F.C., Irr., P.	Boulder	1936	1,034,800(5)	15(6)	1,322,300	19(7)
Central Valley	California	Sacramento	F.C., Irr., P.	Keswick	1947	75,000(8)	3	75,000	3
Central Valley	California	Sacramento	F.C., Irr., P.	Shasta	1944	154,000(9)	4	379,000(10)	7
Colorado-Big Thompson	Colorado	Power Conduit No. 1A	Irr., P.	Estes	1949	45,000(11)	3	45,000	3
Colorado-Big Thompson	Colorado	Power Conduit No. 1	Irr., P.	Mary's Lake	1949	8,100	1	8,100	1
Columbia Basin	Washington	Columbia	F.C., Irr., P.	Grand Coulee	1941	668,000(5)	8(12)	1,974,000(13)	21
Davis Dam	Ariz.-Nev.	Colorado	F.C., Irr., P.	Davis Dam	1949	225,000(14)	5	225,000	5
Hungry Horse	Montana	So. Fork Flathead	F.C., Irr., P.	Hungry Horse	Indefinite	(2)	(2)	286,000(2)	(2)
Missouri Basin	Wyoming	Big Horn	F.C., Irr., P., Silt	Boysen	1950	15,000(15)	2	15,000	2
Missouri Basin	Wyoming	North Platte	P.	Kortes	1949	36,000(16)	3	36,000	3
Shoshone	Wyoming	Shoshone	P.	Heart Mountain	1947	5,000	1	5,000	1

(1) F.C. = Flood Control; Irr. = Irrigation; P. = Power; Silt = Silt Control.
(2) Design not definitely decided.
(3) 2—13,500 kw.
(4) 3—13,500 kw.
(5) As of December 31, 1946.
(6) 12—82,500 kw., 1—40,000 kw., 2—2,400 kw.
(7) 15—82,500 kw., 2—40,000 kw., 2—2,400 kw.
(8) 3—25,000 kw.
(9) 2—75,000 kw., 2—2,000 kw.
(10) 5—75,000 kw., 2—2,200 kw.
(11) 3—15,000 kw.
(12) 6—108,000 kw., 2—10,000 kw.
(13) 18—108,000 kw., 3—10,000 kw.
(14) 5—45,000 kw.
(15) 2—7,500 kw.
(16) 3—12,000 kw.

Riverside E. L. & W. Dept.

Approximately $127,000 was spent by the Electric Department of the City of Riverside for new and improved facilities in 1946. It is anticipated that about $200,000 will be expended for similar purposes in 1947. The increase is based primarily on surveys of additional domestic, industrial and commercial consumers to be served.

While capacities were not increased in 1946, we did construct 5½ mi. of additional 4-kv. distribution which, together with lines already constructed, serve approximately 400 additional consumers.

In connection with Southern California Edison Co.'s frequency change, the city's Board of Public Utilities decided to convert that portion of our system now served at 50 cycles, to 60 cycles. This work, involving close to 12,000 consumers, will take place during 1947.

Other work scheduled for the year includes an additional 33-kv. line of about 2 mi., to be connected to transmission line to be constructed by Southern California Edison. This will also involve a 6,000-kva. transformer bank. Scheduled additions to the 4-kv. distribution system amount to some 7 mi.

In considering our load from the demand standpoint, we estimate that the 700 additional customers who are anticipated will create an added 1,000 kw. demand during 1947.—*L. W. Grayson, superintendent.*

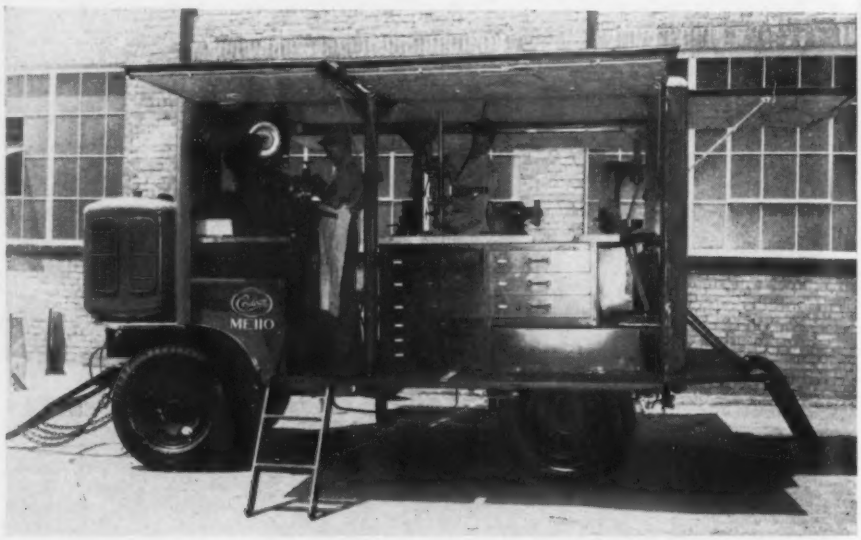
San Diego Gas and Electric

The year 1946 saw a fairly complete conversion from a wartime to a peacetime economy in San Diego. Since our community had been one of those most affected by the advent of war industries and a war-swollen population of industrial workers and servicemen, it was similarly affected by the cessation of war activities. By the end of 1946 reconversion had been complete, at least to the extent of the reduction of naval shore-stations and the return of the aviation industry to a peacetime status. In spite of these changes and the shortages in labor and building materials that have curtailed commercial and industrial building, the dislocation in the San Diego area has been much less than was anticipated. Although the government-sponsored housing projects erected during the war are still in use, a housing shortage continues to be evident.

Capital expenditures made by the San Diego company during 1946 totaled $3,170,000. They would have been greater had the necessary materials and labor been available. The budget for 1947 contemplates the expenditure of about 13,700,000. The difference between the two years is accentuated because the major part of the cost of the new 50,000-kw. turbogenerator (Unit No. 2 now being installed at Silver Gate station) will be incurred during 1947. This unit is scheduled to go into operation in November of the present year. The past year saw the addition to our system of 18,000 kva. in substation transformer capacity, and approximately 103 mi. of lines of 12 kv. or lower. The net gain in electric customers during the year exceeded 7,000.

The major system development contemplated for 1947, aside from the steam-plant addition already mentioned, is an outer ring of 66-kv. lines and substations to serve the rapidly growing suburban and agricultural territory. The first element of this ring, a line 28 mi. long, from El Cajon to Descanso, is now under construction. Subsequently, a 66-kv. line will be built from Descanso northward via Santa Ysabel to Warners, and thence westward via Monserate and the San Luis Rey Valley to a new station to be constructed at San Luis Rey. A second ring through the southern territory will be built from Silver Gate station to Otay and thence northward via a new substation at Chollas Heights to El Cajon. Finally, we expect to complete an inner ring between Silver Gate station and Old Town substation via Station B. These lines will involve the building of substations totaling some 200,000 kva. It is hoped that approximately half of this program can be completed in 1947.

The company's peak load for the past year was 177,000 kw. A further increase to 190,000 kw. is expected in the coming year, during which time some 7,500 new electric customers should be added to the lines. At present our backlog of electric customer applications is 5,000. These are mostly in suburban territory, and distribution line extensions of considerable length are required to reach many of them. During the early part of the year material and apparatus shortages comprised the primary reasons for delay in serving new customers. At present, while these have by no means been obviated, a shortage of linemen is the most serious delaying element. Several outside contractors have now been employed to build lines for the company, and a lineman's school is under way in order to increase the number of men available. By these means it is hoped new suburban customers may be connected more promptly in the future.—*L. M. Klauber, president.*



In addition to being occupied with an expansion program which sets an all-time record, Southern California Edison is carrying on the enormous job of changing system frequency to 60 cycles. Portable machine shop helps speed up change-over

Southern California Edison

In 1946 we spent approximately $18,000,000 for new substations, transmission lines, distribution lines, and improvements and additions to existing facilities.

Our 1947 system betterments budget is the largest we have ever had, totaling $52,000,000. This does not include any normal operation and maintenance expenditures, nor approximately $15,000,000 which will be spent for the conversion of consumers equipment from 50 cycles to 60 cycles during the year. The reason the 1947 construction budget is so large is that it includes the new steam plant at Redondo, additions to the Big Creek hydro system, two new major 220-kva.

substations, 37 new transmission and distribution substations, as well as additions to transformer capacity in many existing subs.

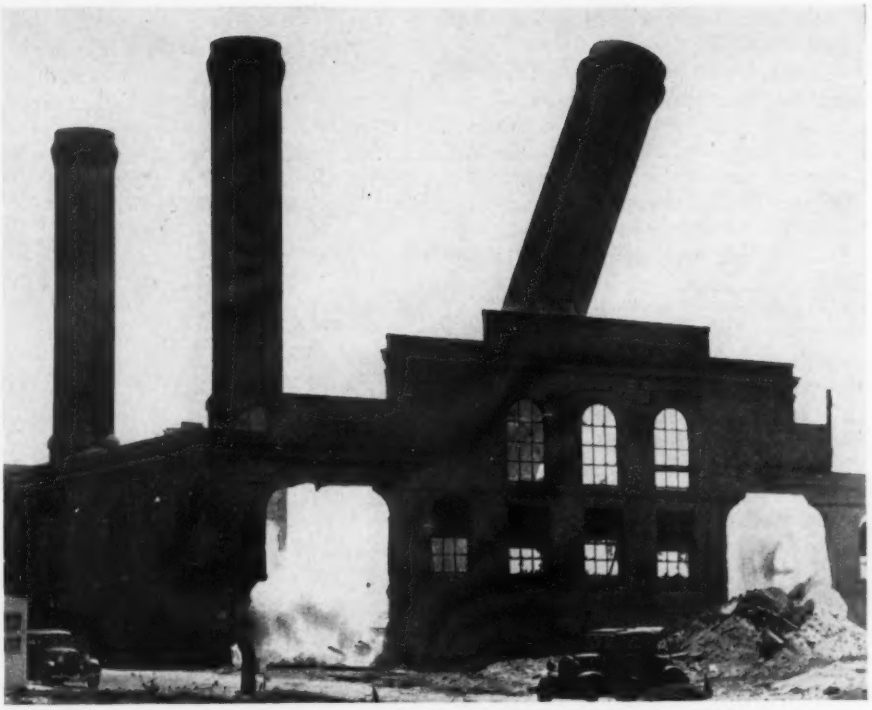
No new additional generating capacity was constructed during 1946, but the placing in service of the third Boulder 220-kv. transmission line, together with the new Highgrove substation and frequency changer makes 135,000 kw. of additional generating capacity available to the Edison system. This was made possible by the greater use of generating facilities which were installed at the Boulder power plant for the Metropolitan Water District, and by using the M.W.D. 220-kv. transmission line from Boulder to Hayfield.

In 1946, twelve new substations were constructed which together with additions to existing stations increased the substation capacity by 390,000 kw. Fifty miles of transmission lines were constructed, and 370 mi. of distribution lines. During the year 50,000 kva. of capacitors were installed in substations, and 20,000 kva. on distribution lines. These capacitors were installed in selected locations so as to relieve the load on certain station transformers which had had a very rapid increase in load, and to improve regulation on the distribution system.

Approximately 40,000 new customers were connected to our lines during the year, with a net increase in connected load of 225,000 hp.

With the manpower and material situation which existed during the year, the connecting of this new business was a major problem. To meet this situation it was necessary to enlarge the line construction organization. All returning Edison veterans and others applying were absorbed into the company with other manpower available. This gave us unbalanced crews and it was found necessary to establish a lineman's training school. This school, which was started early in June, gives an intensive training course and has helped very materially in building up construction crews rapidly. Two crews have graduated and the third will complete the course very shortly. A cable-splicers school has been started and very shortly one will be opened for estimators. In addition as many as 38 line construction contractor's crews have been employed to assist in this work.

During the year the frequency change program advanced to the stage of actual cutover of consumers and to date all of Santa Barbara, Ventura, Oxnard, and Santa Paula have been converted to 60 cycles. Work is progressing in the Antelope Valley, and when this is completed in the next few months, all the Edison system north of the Santa Monica Mountains will be operating at 60 cycles. Work is also in progress in Riverside, and San Bernardino counties.

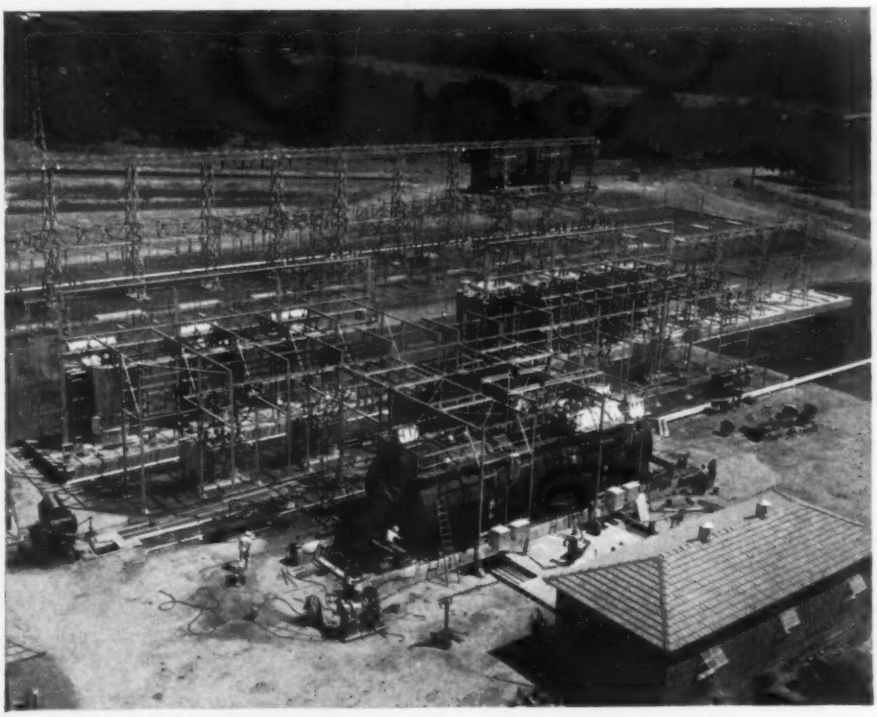


Demolition of Redondo steam plant made way for construction of Southern California Edison's new plant of the same name, where system hopes to have two new 60,000-kva. steam units in operation by end of this year. Two more units ordered

As outlined above, 1947 is going to be a very busy year. Work has been in progress at the Redondo steam plant for a number of months, and it is expected that two 60,000-kw. units will be ready for service by the end of the year. Two additional similar units are now on order, and it is expected they will be ready for service the latter part of 1949 or early in 1950.

Work is also in progress at Big

Steadily growing demand for additional energy sources in southern California is also being met in part by Edison's construction of Highgrove substation, to work in conjunction with Boulder transmission; foreground, condenser, low-voltage racks



Creek No. 3 on the installation of an additional 35,000-kw. hydro unit, which is expected to be in service before the run-off of next year.

The two major 220-kv. substations will be: one in the San Joaquin Valley, and one east of the Laguna Bell station. The 37 new substations, some being 66/11 or 16 kv., and some 16 or 11/4 kv., will aggregate 590,000 kw.

One hundred and thirty miles of 66-kv. transmission, and 460 mi. of distribution lines are programmed for the year.

With the large number of new homes under construction in the territory, together with the commercial and industrial activity, it seems reasonable to expect that as many new customers will be added in 1947 as in 1946.

The frequency change program will be accelerated during the coming year so that if there are no delays in receipt of equipment and materials conversion will be completed by the end of 1948.—*N. B. Hinson, vice-president*

Turlock Irrigation District

Turlock Irrigation District's 1946 electrical construction covered a new rural substation, 14 mi. of 66-kv. transmission, and 45 mi. of 11-kv. distribution line. New service connections totaled 1,188 during the year. Total construction cost approximated $270,000.

For 1947, the budget is substantially the same and will cover the modernization of one substation, the addition of capacity at two others and probably about 40 mi. of distribution line. Customer and load increases are anticipated at about 10% growth.—*L. H. Parker, electrical engineer.*

Colorado

Colorado Springs P. U. Dept.

About $165,000 was spent for new and improved facilities in 1946, and about $500,000 is budgeted for 1947. The first figure does not include a 5,000-kw. turbogenerator put in service in 1946, but paid for in 1945.

Our distribution transformer capacity was increased by 2,015 kva., to an installed total of 25,223 kva. These additions were limited by transformer availability—we were unable to replace transformers unless the actual hour peak load on them exceeded 200% of their rating. We added just under 1,000 meters. Line extensions were mostly short additions to the 6,900-volt distribution system.

In 1947, delivery of a new 100,000 lb./hr. boiler is expected, and it is hoped the distribution transformer capacity can be increased 20%. We are planning on increases of meters from 18,600 to 19,600, and in maximum hour demand from 16,100 kw. to about 18,000 kw.—*F. H. Wiley, superintendent, electric division.*

Barker Dam is getting a new concrete face in unusual job under way for Public Service Co. of Colorado. Started last year, refacing will be completed in 1947, when water can again be drawn down for resumption of work on entire dam face

Colorado-Big Thompson, USBR

Construction of Shadow Mountain Dam was completed in 1946, and construction started on Granby Dam and Horsetooth reservoir. Final concrete lining was placed in the 13-mi. Alva B. Adams tunnel through the Continental Divide. Contracts are expected to be awarded early in 1947 for the construction of the Marys Lake and Estes power plants. Construction is expected to start on Brush-Sterling and Sterling-Holyoke transmission lines.

Frontier Power

In 1946 we spent for new and improved facilities $37,000 and for the same purposes during 1947, we expect to spend $50,000. There were no material changes in generation, transmission or distribution during 1946, nor do we anticipate any during 1947. Added meters amounted to 400.

During 1947, we plan to modernize lightning arrester protection at our Trinidad station on the 22-kv. transmission lines, also to add new oil circuit breakers on these circuits. At our Walsen station we plan the addition of a 1,000-kva. distribution transformer substation supplying the town of Walsenburg. We plan to build approximately 60 mi. of 7,200-volt single-phase distribution line to supply approximately 175 rural consumers.

The total anticipated customer increases will be about 700, and we expect to connect one 300-kva. and one 1,000-kva. substation; these are being installed by REA cooperatives near Trinidad, Colo., and Springer, N. M. —*P. M. Brown, electrical superintendent.*

Public Service of Colorado

Because of lack of materials, construction expenditures for 1946 did not reach the magnitude expected. Approximately $2,100,000 was expended. Around $6,000,000 will be spent for electric construction in 1947.

Review of 1946

Nominal progress was made on new South Denver terminal, and work on refacing Barker Dam (water supply for Boulder hydro plant) is progressing satisfactorily; both are to be completed in 1947.

During the year there were added: 3,000 kva. of substation transformer capacity, approximately 160 mi. of distribution lines, about 7,000 addi-

tional electric customers. After the return to standard time in the latter part of 1945, peak loads showed an unprecedented increase, which has continued throughout the year of 1946. Irrigation pumping loads on certain parts of the system were unusually heavy in 1946.

Plans for 1947

The increasing demands for electric power have accelerated the plans for additional generating capacity. Work has already been started on 10,000 kw. of additional generating capacity in two sections of the system and this capacity should be supplying the load in 1947. An additional 35,000 kw. is under way for completion in 1948. Additional capacity is all steam.

Accompanying the increase in plant capacity will be approximately 56 mi. of 110-kv. lines, 72,500 kva. in substation transformer capacity, and 250 mi. of distribution lines. Customer growth is expected to continue at a pace slightly less than that of 1946, or approximately 6,000 added customers in 1947. — *F. F. McCammon, vice-president.*

Southern Colorado Power

We spent $368,000 for new and improved facilities in 1946, and have budgeted $1,237,579 for 1947. The increase is due almost entirely to items connected with a new 15,000-kw. steam plant and associated outdoor substation.

A 1,500-kw. steam unit was purchased from an abandoned coal mine and installed in our Pueblo standby plant last year, to help out on peaks until our new unit is installed. Transformer additions totaled 4,377 kva. in 1946, and 83 mi. of distribution line were built. Of this, nearly 80 mi. was rural, where extensive use was made of single-phase line, one side grounded, with the ungrounded wire at the pole top for lightning protection, and the ungrounded wire on spool for 2,300 volts.

The new steam unit will be situated in a new building at Pueblo. It will operate at 650 psi., 900°. The generator will be 15,000 kw. with 25% overload capacity. Scheduled 1947 additions of transformer capacity amount to 31,500 kva. as follows: Canon City, 4,000 kva., 4.16/23 kv.; Pueblo, 12,000 kva., 14/66 kv.; Rocky Ford, 2,000 and 3,000 kva., 66/13.8 kv; Fowler, 1,500 kva., 66/13.8 kv.; Ice Co., 500 kva., 13.8/2.3 kv.; Pueblo, 2,000 kva., 13.8/4.16 kv., and two customer owned stations making up the remainder. — *M. G. Lord, vice-president in charge of operations.*

Idaho

Boise Project, USBR

Excavation for the power house at Anderson Ranch Dam was started in 1946, and construction is expected to proceed at such a pace that the power house will be ready for the installation of generators upon their arrival in the fall of 1947. The dam proper is at present 96% complete. Construction on Cascade Dam was started during the year.

Idaho Power

Idaho Power Co. spent approximately $5,700,000 on additions to property during 1946, and has budgeted for 1947 approximately $8,900,000. Expenditures during 1946 fell short of the amount budgeted for the year by about $1,400,000 as a result of difficulty in obtaining equipment for installation.

The increase in the budget for 1947 as compared with 1946 is the result of the company's having under construction at this time four hydroelectric developments, one of which we had expected to have in operation in the fall of 1946.

The major construction projects carried on during 1946 consisted of one 16,500-kw. hydro generating plant and a considerable number of miles of both transmission and distribution lines. The last two were completed pretty well according to schedule, but the generating station is behind schedule at least six months.

During 1946, 69,500 kw. of net additions to power plant capacity were started. This work will not be completed before 1949. One generating station of 16,500 kw. was started prior to 1946 and is not expected to be in operation before the spring of 1947.

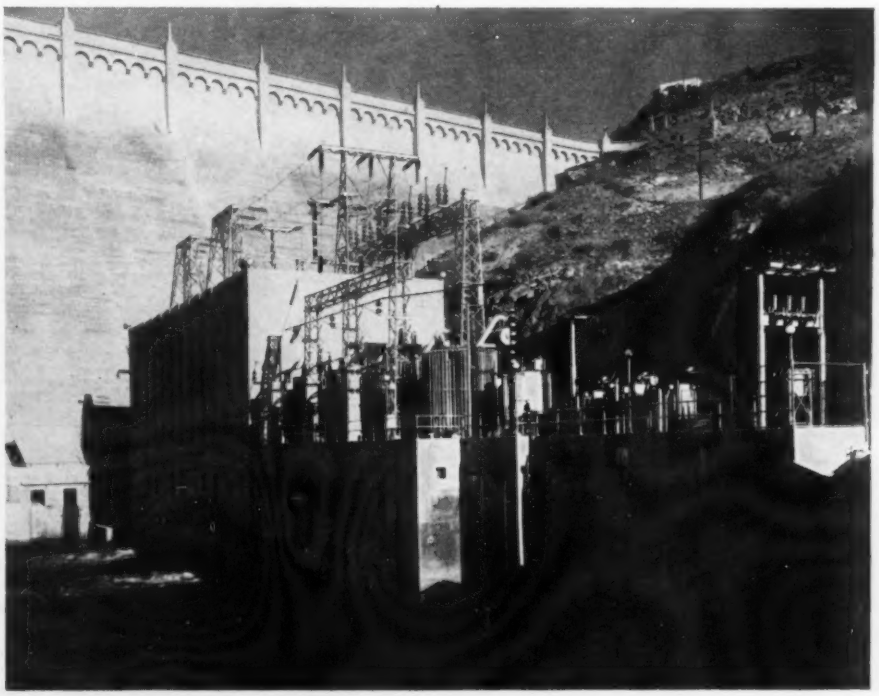
While considerable numbers of power transformers have been ordered for step-down substations, only two transformers of 20,000 kva. each were received during the year.

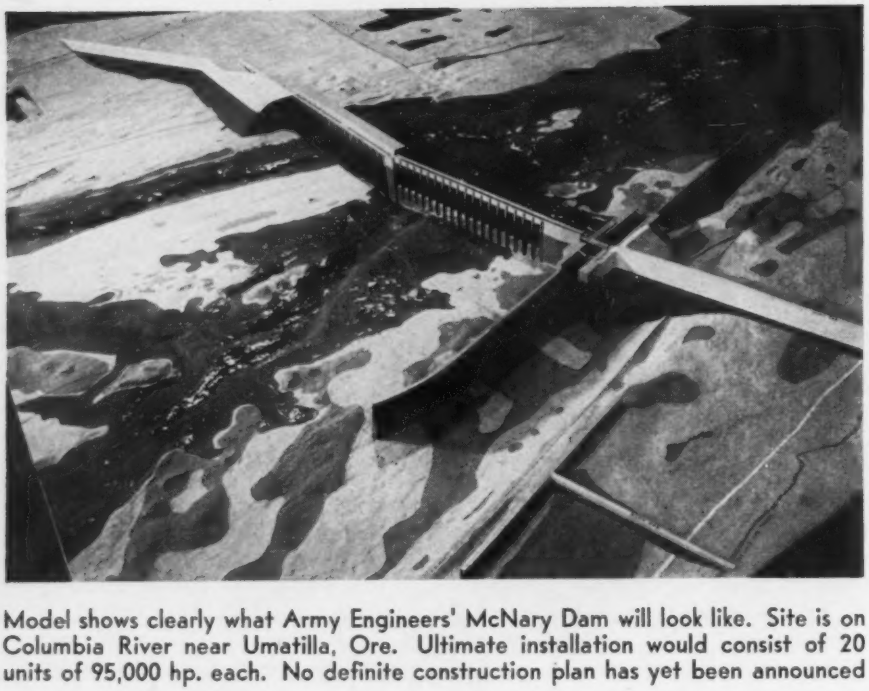
Approximately 121 mi. of 138-kv. and 134 mi. of 69-kv. transmission lines were constructed during the year. Approximately 710 mi. of 7.2/12.5-kv. and 50 mi. of 2.4/4.2-kv. distribution lines were built.

New customers added during the year totaled 6,900, but approximately 1,000 of these were connected without meters because of our inability to get delivery. No record is available for connected load taken on during the year but the system peak load increased 22,100 kw.

The principal plans for 1947 consist of the completion of a hydroelectric development of 16,500 kw. and a continuation of the work on the additional three power plants started during 1946. A number of substation improvements will be started during the year, but delays on equipment will make it impossible to complete this work before 1948.

Elephant Butte dam and power house are part of the Bureau of Reclamation's Rio Grande project. Plant is in New Mexico and has installed capacity of 24,300 kw.





Model shows clearly what Army Engineers' McNary Dam will look like. Site is on Columbia River near Umatilla, Ore. Ultimate installation would consist of 20 units of 95,000 hp. each. No definite construction plan has yet been announced

Anticipated additions are: generating capacity, 16,500 kw.; substation transformer capacity, 20,000 kw.; miles of transmission line, 50; miles of distribution line, 750.

It is expected that the increased load in 1947 will be between 16,000 and 17,000 kw. We expect to install an appreciable amount of supervisory control equipment in connection with substation operation.—*B. C. Russell, general superintendent*

Montana

Hungry Horse Project, USBR

During 1947 construction started on the government camp and an access road. A contract is expected to be awarded during 1947 for Hungry Horse Dam, the largest concrete dam in the bureau's immediate program. In addition to generating a large block of power, Hungry Horse Dam will provide regulation of the Columbia River to increase firm power at Grand Coulee and Bonneville.

Nevada

Sierra Pacific Power

Expenditures for new construction and replacements in 1947 totaled approximately $550,000. Some items included were: 7 mi. of 60-kv. transmission line; 40 mi. of distribution lines, 2.3 to 13.8 kv.; 12,500 kva. of substation transformers; 6,400 kva. of line transformers; reinforcement of many distribution circuits; net addition of 1,818 meters in service.

Estimated construction budget for 1947 totals $875,000, of which $150,000 is unfinished construction carried over from 1946. Principal items projected are: 38 mi. of new 60-kv. line; estimated 120 mi. of distribution lines in voltages between 2.4 and 13.8 kv.; increase in conductor sizes on several transmission and distribution circuits; 3,000 kva. of substation transformers; approximately 10,000 kva. in line transformers; anticipated addition of 2,000 meters; installation of several thousand kva. of capacitors.

Items programmed, but not listed above because of slow delivery of equipment and material, include 20,000 kva. of substation transformers; supervisory control for two hydro plants and one substation; replacement and addition of several 23-kv. and 60-kv. oil circuit breakers and feeder regulators.

System peak load increased about 16% in 1946 and similar increase is anticipated in 1947, these increases being met by purchase.—*V. D. Armstrong, engineer.*

New Mexico

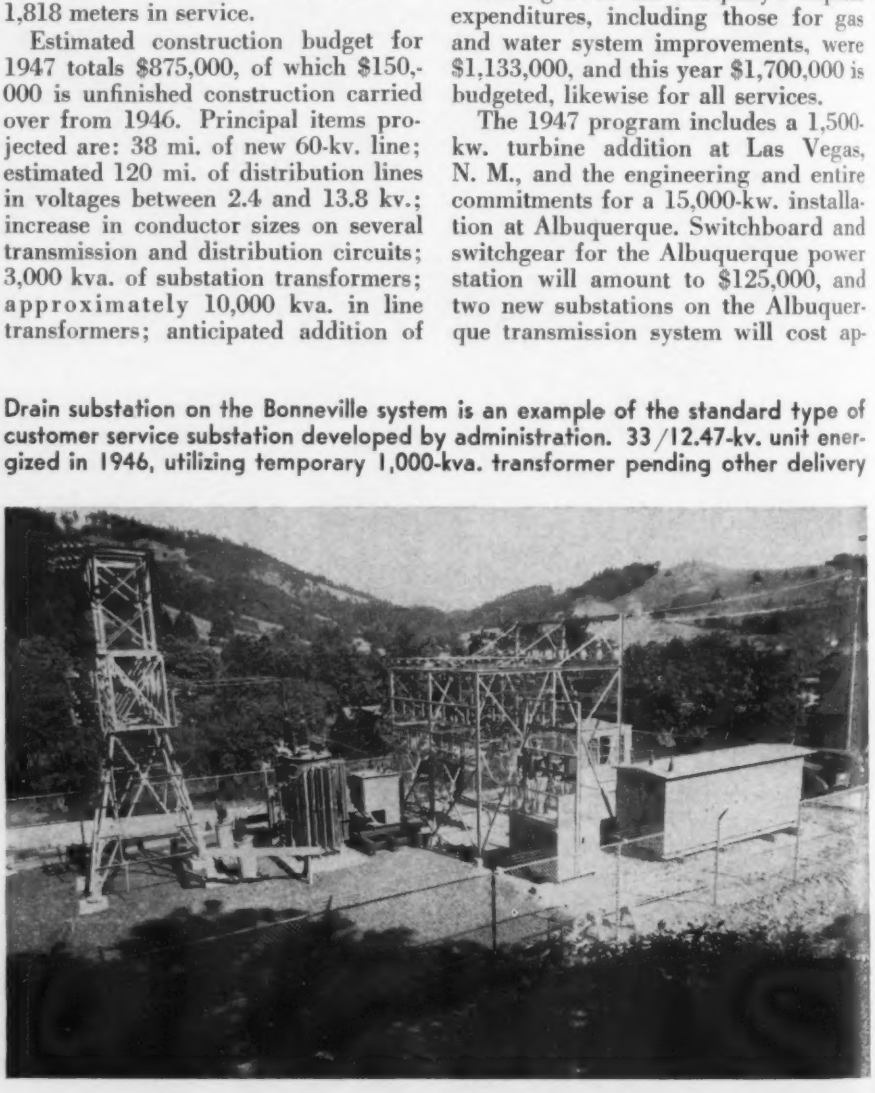
P. S. of New Mexico

Public Service Co. of New Mexico was formed during 1946 by the merger of Deming Ice & Electric Co., New Mexico Power Co., and Las Vegas Gas & Electric Co. with the Albuquerque Gas & Electric Co.

During 1946 the company's capital expenditures, including those for gas and water system improvements, were $1,133,000, and this year $1,700,000 is budgeted, likewise for all services.

The 1947 program includes a 1,500-kw. turbine addition at Las Vegas, N. M., and the engineering and entire commitments for a 15,000-kw. installation at Albuquerque. Switchboard and switchgear for the Albuquerque power station will amount to $125,000, and two new substations on the Albuquerque transmission system will cost ap-

Drain substation on the Bonneville system is an example of the standard type of customer service substation developed by administration. 33/12.47-kv. unit energized in 1946, utilizing temporary 1,000-kva. transformer pending other delivery



proximately $100,000. The latter will amount to 8,000 kva. There are plans for the development of additional generating capacity for Albuquerque this year, details of which have not yet been worked out.—*Arthur Prager, president.*

Oregon

Bonneville Power Administration

Rapid conversion of the Pacific Northwest from a war to peacetime economy presented major problems of construction and service to the Bonneville Power Administration. Closing of light-metal plants resulted in the cancellation of 425,000 kw. of load, but the power surplus was of short duration as aluminum plants resumed operation and consumer demands swung sharply upward.

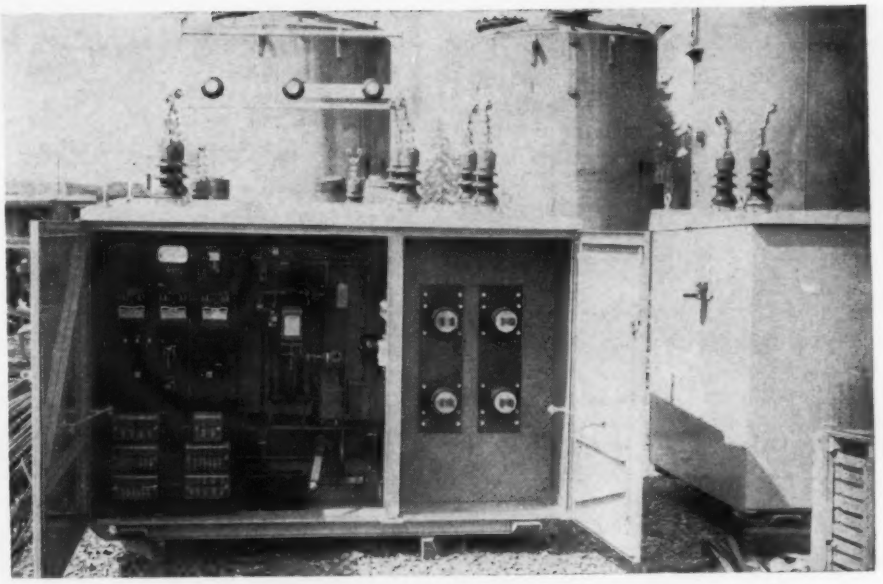
While energy deliveries from Bonneville and Grand Coulee dams dropped from 7,436 million kwh. in 1945 to 6,383 million kwh. in 1946, mounting industrial demands reversed the trend, and during the past three months energy deliveries were 55% higher than the same period of the previous year. Efforts to meet this heightened demand were hampered by prevailing lack of materials, and for a time critical power shortages threatened part of the area.

Budgets for the accelerated construction program totaled $13,000,000 during the calendar year 1946, and an additional $7,000,000 is scheduled for expenditure by June 30 of this year. To meet the regional requirements for new transmission and substation capacity, President Truman has recommended to congress appropriation of $15,578,000 for the next fiscal year. An additional $6,000,000 is being requested to permit advance commitments for materials requiring a long period of manufacture.

Transmission

Despite delays in delivery of materials, construction schedules of the Bonneville Power Administration, for the most part, were met. A total of 118.5 circuit mi. of transmission line was placed in service during the fiscal year, and an additional 78.3 mi. was placed in service by the close of the calendar year 1946. On Dec. 31, 1946, the federal network in the Pacific Northwest totaled 2,917.7 circuit mi. and 66 substations of 3,328,883-kva. transformer capacity. This included 1,287.2 mi. of 230-kv. lines and 1,225.8 mi. of 115-kv. lines.

A major contribution toward the completion of the basic grid system was the energization of the 51-mi., Midway-Columbia line. In October 1946, a 115-kv. customer service extension from Albany to Toledo, Ore., was energized to serve one of the areas most severely affected by power shortage.



Bonneville Power Administration makes extensive use of static capacitors. This view of equipment for switching capacitors on and off the line shows switchboard panel, breaker mechanism, and the fuse mounting for the potential transformers

Other lines constructed during 1946 included 13.6 mi. of 115-kv. line from Bethany to Forest Grove, Ore., and 22.2 mi. of 57-kv. line from Salem to Willamina, Ore. Major substation installations included 66,000 kva. at the Salem Alumina substation; 25,000 kva. at Chehalis, Wash.; 12,500 kva. at Vancouver; 6,000 kva. at Forest Grove, Ore.; and 5,000 kva. each at Coulee City, Wash., and Milton, Ore.

Major construction scheduled for completion within the next few months includes a 250,000-kva. forced-air, forced-oil-cooling transformer bank at Troutdale, Ore. It is intended to serve the newly reopened aluminum plant of the Reynolds Metals Co., and loads within the Portland area. This bank will be the largest on the federal network. A 100,000-kva. transformer bank with 115-kv. line terminal is under construction at Columbia (Wash.) substation, and a 100,000-kva. substation is being installed at Longview.

Energization of a number of important transmission lines is scheduled for the current year, including a portion of the Hungry Horse-Kerr project in Montana, as well as the following: Arlington - Bellingham - Blaine, The Dalles-Goldendale, Mossy Rock-Morton, Columbia-Ephrata-Moses Lake, and a number of lines in Stevens County, Wash., including Spokane-Colville, Colville - Spirit, and Spirit - Metaline Falls. On Jan. 3, 1947, a 44.4 mi. Grand Coulee-Foster Creek-Brewster line and substation were energized.

Special attention was devoted by the administration to the development of methods and equipment for increasing distance of power transmission, with particular emphasis on the use of series capacitors for compensating all or a portion of the line reactance. Bonneville engineers completed the translation and study of captured German documents dealing with the design, construction, and operation of 440,000-volt a-c and d-c transmission lines, and the status of high-voltage rectifiers and inverters in Europe.

Six-Year Program

Advance construction program for a six-year period (1947-1953) to meet the power requirements of the Pacific Northwest is being formulated in cooperation with the Bureau of Reclamation and the U. S. Corps of Engineers, based on an estimated load growth of approximately 285,000 kw. per year. Demands of industrial and utility customers are forecast to double the peak load of the Bonneville Power Administration between 1947 and 1952 and to increase another million kilowatts by 1955.

To meet this demand the Bonneville Power Administrator has recommended an accelerated program for installing maximum generating capacity at Grand Coulee Dam; and swift construction of McNary, Foster Creek, and The Dalles dams on the Columbia River; Detroit Dam on the Santiam River in Oregon; Hungry Horse Dam in Montana; and six dams on the lower Snake River.—*S. E. Schultz, chief engineer.*

California Oregon Power

Approximately $1,834,000 was spent for new and improved facilities during 1946; $1,466,000 has been budgeted for 1947, the smaller figure being mainly due to lesser transmission line cost estimates over 1946, which included some 68 mi. of 66-kv. line to Crescent City, Calif., over extremely difficult and heavily timbered right of way. Approximately 25 mi. of additional 66-kv. transmission line were constructed between Dixonville and Myrtle Creek.

Approximately 27,500 kva. of distribution transformers and 18,525 kva. of substation transformers were installed during 1946. A total of 93½ mi. of transmission line above 11 kv., and 185 mi. of distribution line were constructed. The net change in the number of meters is estimated at 4,500. Due to inability to obtain meters there were, however, some 2,900 non-metered services at the end of the year, as compared with 450 at the start. We experienced a 9½% increase in retail customers and a 17% increase in total energy retail sales. Wholesale kilowatt-hour deliveries showed a slight decrease, some load having been dropped in order to meet the regular system requirements. The retail system maximum demands increased about 25%, while the total system maximum demand increased about 13%. During the year, approximately 6,000 kva. in capacitors were installed.

For 1947, the company will undertake construction of a new 25,000-kw. hydroelectric plant on the North Umpqua River at Toketee Falls. Completion will probably be in 1949. To take care of immediate requirements, negotiations are under way for purchasing 20,000 kw. of power from northern California installations. Providing we are able to obtain transformers, we are figuring on 25,000 kva. of substation capacity additions in 1947, and expect to add at least as much distribution transformer capacity as in 1946. Approximately 74 mi. of 66-kv. transmission line are slated for construction during 1947, about 60 mi. being between Alturas, Calif. and Lakeview, Ore., and it is estimated that some 175 mi. of distribution line will be built, all providing that sufficient material is obtainable.

Load and customer increases should continue at least as great as during the past year, a large portion of the increase in load being due in 1946, to the lumber industry. Again, as in 1946, it is proposed to continue the installation of capacitors to at least the same and probably greater extent. —*J. C. Boyle, vice-president and general manager.*

Mountain States Power

No additional generating capacity was added by Mountain States Power Co. during 1946, but total construction expenditures were far in excess of those of any previous year. Only about 10 mi. of 66-kv. transmission line were constructed but 223 mi. of pole line were added to the distribution system together with approximately 35,000 kw. of distribution transformers. There were also added approximately 7,250 customers during 1946; the majority of these customers were located in rural territories.

During 1947 it is proposed to construct a 66-kv. transmission line approximately 20 mi. from Springfield to Cottage Grove. It is also proposed to construct a 15-mi., 57-kv. transmission line from Boyer to Otis, together with other short extensions. The majority of the 1947 construction budget of approximately $1,350,000 covers additions and extensions of the distribution system. — *G. McClellan, chief engineer.*

Eugene Water Board

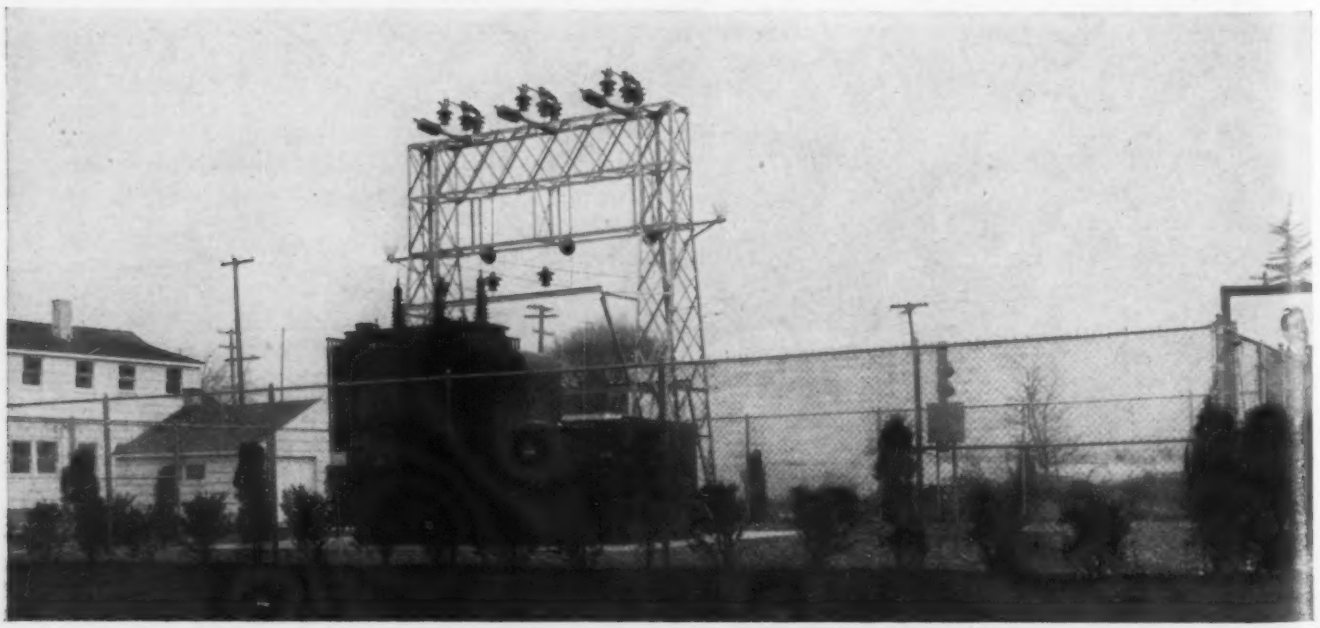
The system peak load of the Eugene Water Board in December 1946, was 25,000 kw. In 1947 it will be well over 30,000, more than double the 1944 peak of 15,000 kw.

On Dec. 1, 1946, the total number of customers was 13,812, an increase of 29.3% in two years. Residential customers are estimated to have averaged 4,250 kwh. for the year 1946. In 1945 the average was 3,799 and in 1944, 3,424. For the first time in our history, in 1946 the revenue from sales of energy exceeded $1,000,000.

The rapid increase in load and number of customers has put a strain on all facilities. Because of many difficulties, the amount of construction that could be carried on was limited, amounting to approximately $200,000.

A sum of $3,383,000 has been budgeted for new construction in 1947. Of this, $337,000 will be for additions to the distribution system; $384,000 has been allocated to the installation of the second unit at Leaburg plant; bids have been requested from manufacturers for a water wheel and 7,500-

Portland General Electric's Richmond substation typical of new system additions; designs provide space to double capacity



kw. generator (of the same capacity as the first unit installed in 1930); $556,000 has been set aside for the replacement, with a 2,000-kw. increase in capacity, of the power house and machinery of the Walterville hydro plant, originally built in 1911, and now of 3,050 kw.; $1,755,000 has been budgeted for a 25,000-kw. addition to the Eugene steam plant. This would increase the plant capacity from 16,000 kw. to 41,000 kw.—*R. B. Boals, general superintendent.*

Northwestern Electric

In 1946, we spent approximately $871,000 as compared with a budget estimate of $1,798,300 for 1947. The 1946 budget was $1,426,000, but as a result of late delivery of material and labor shortage, some of the work planned was not completed.

The Albina-Troutdale 110-kv. transmission line, estimated in the 1946 budget at $501,700, was one of the larger items not completed, only $150,000 being spent in 1946. No outstanding projects aside from the Albina-Troutdale line were started in 1946.

Additions to plant were: 20,000 kva. of substation transformer capacity; 7 mi. of transmission line completed (11 kv. and up); 40 mi. of distribution line (below 11 kv.); approximately 2,300 meters issued for customers' services. A net of 47,400 kw. of connected load was added.

Additions and betterments planned for 1947:

New 150,000-lb./hr. boiler at Pittock station	$275,000
Increase capacity of No. 9 boiler at Lincoln station from 170,000 to 300,000-lb./hr. by installation of water walls	202,700
Complete Albina-Troutdale 110-kv. transmission line	250,000
66 kv. grounding and high speed relaying	68,000
Install two 66/2.4 kv.-3,000 kva. substations	82,000
Install 8,500 kvar. of 11 kv. and 3,100 kvar. of 2.4 kv. of shunt capacitors	82,000

In addition to above, we expect to install 19,100 kva. of transformer capacity, 22 mi. of transmission line, and 35 mi. of distribution line.

Our 1947 budget is based on an estimated increase in system load of 6% over 1946. This would give an annual consumption of 692 million kwh. Electric customers are estimated to increase by approximately 600 to a total of 52,100.

If substation transformers and equipment and distribution transformers were not on such a long delivery basis, house heating load, now restricted, would cause an increase in our 1947 percentage in excess of the above figure.—*O. L. LeFever, chief engineer.*

Pacific Power & Light

Approximately $2,600,000 was spent for new and improved facilities in 1946, and it is contemplated that in excess of $2,000,000 will be spent in 1947.

No additional generating capacity was installed in 1946. It is anticipated that a 1,000-kw. diesel unit will be installed in 1947.

In 1946 approximately 12,500 kva. of additional substation transformer capacity was installed, and our program for 1947 contemplates an addition of approximately 22,500 kva. to take care of load growth and modernization of certain station facilities.

During 1946, approximately 17 mi. of 22-kv. line was constructed, and in 1947 it is contemplated that a 22-kv. line approximately 18 mi. in length will be completed. Both are replacements.

New distribution line construction has been primarily in rural areas with approximately 250 mi. completed in 1946, putting the number of farms served by the company in Oregon and Washington over the 15,000 mark. One out of every five residences now served by the company is a farm dwelling, while four out of every five of the total miles of pole lines are located in rural and farming territory. Our program contemplates the construction of approximately 250 additional miles in 1947.

We expect that the company's main system will increase about 15% in average load in 1947, and that approximately 3,000 new customers will be served on all systems of the company. —*H. H. Schoolfield, general superintendent.*

Portland Dist., Army Engineers

Except Bonneville Dam, the only project of the Portland district, U. S. Army Engineers, involving power development is McNary Dam on the Columbia River near Umatilla, Ore. A power and navigation project with fish facilities, McNary Dam will have its power house on the Oregon side of the Columbia River and contain structural provisions for the installation of 14 Kaplan turbines of 95,000 hp. each, with provision in the layout for the ultimate installation of 20 units totaling 1,900,000 hp. To date there has been no construction work on McNary Dam and approval to begin work has not yet been received by this office.—*Col. Frank L. Beadle, executive officer.*

Portland General Electric

Our 1946 expenditures totaled $3,500,000, and it is expected that those for 1947 will be greater.

The 1947 construction program includes a comprehensive modernization program for 57-kv., 24-kv., 11-kv., and 4.15-kv. switching stations. In working out the 57-kv. program, we purchased new high-capacity breakers for installation at the points of high power concentration. The 57-kv. breakers which will be released from these close-in stations will be reinstalled for line sectionalization in outlying areas where the short-circuit interrupting requirements are less severe.

Reclosing breakers will replace repeating type fuses on certain 24-kv. circuits where relay coordination is essential. Most of the new breakers for 11 kv. are of the metal-clad type. Adequate provisions have been included for grounding 11-kv. system where metal-clad equipment is installed. The new breakers for 12.5-kv. and 4.15-kv. distribution feeders are specified with ample interrupting capacity for application of immediate-reclosure feeder relay equipment.

Unit Substations

The construction program makes liberal use of factory-assembled unit substations of 3,000-kva. capacity located at logical load centers and arranged for stepping directly from 57 kv. to distribution voltage. This solution reduces losses and eliminates the investment in double transformation, subtransmission and, in many cases, in the distribution feeders. The unit substations are complete with high-tension fuses, lightning arresters, load ratio control and reclosing feeder equipment.

For Portland and Salem the unit substations are arranged for 4.15-kv. distribution voltage; for rural areas they are arranged for 12.5-kv. distribution voltage; for intermediate areas, for serving either 4.15-kv. or 12.5-kv. distribution voltages.

All the layouts for these unit substations provide space for the installation of a second unit of equal capacity. Where practicable, the two units will be supplied from different high-tension sources. A tie breaker will be connected between the two feeders. Normally, one feeder will be connected to one source. However, if that source should fail, then the relay equipment will automatically transfer the feeder affected to the alternate source.

Increasing Distribution Voltages

In rural areas, the allowable circuit loading is generally limited by permissible voltage regulation rather than

by heating. In working out the expansion program for rural areas, the voltage adopted has been 12,500 volts wye. This system uses 7,200-volt distribution transformers and is acceptable for joint use by the Telephone Co.

The company pioneered radio dispatching for emergency service in 1939, and since that time it has proved to be of immense value to the operating department for communication between load dispatcher and trouble cars, when the latter are required to do line switching during wind storms and other system disturbances.

FM 76 Megacycle Radio Network

Our program provides for modernizing and extending the present radio network. In order to provide greater coverage, improved reception, and operation with less restriction from FCC, all extensions will be made with FM 76-megacycle equipment. A new transmitter will be located on Mt. Scott. Car-to-car operation will be possible.—*John Bankus, chief engineer.*

Utah

Telluride Power

Construction expenditures of Telluride Power Co. are estimated at $175,000 for each of the years 1946 and 1947. The 1946 program, now scheduled for completion by Feb. 15, 1947, has been devoted principally to adding 2,000 kw. of transformer capacity, 6 mi. of transmission and 20 mi. of distribution. Connected load increased by 1,200 kw., and 150 customers were added.

The same customer increase and a 2,500-kw. increase in connected load are estimated for 1947. The construction program contemplates the addition of 2,000 kw. of transformers, 10 mi. of transmission and 25 mi. of distribution.—*Paul P. Ashworth, general manager.*

Utah Power & Light

These data are for the Utah Power & Light Co. and do not include The Western Colorado Power Co. It is estimated that $1,563,000 was expended for new and improved facilities during 1946. Our 1947 budget provides for a total expenditure of $3,615,000 for new facilities.

The 1947 budget is large with respect to 1946 expenditures because of carrying over into 1947 numerous projects contemplated for completion in 1946. Also, load growth has been rapid, requiring further increases in distribution facilities.

Progress in 1946 was greatly limited by lack of material and manpower. Total additions were: 700 kw. (internal combustion) of generating capacity; 2,600 kva. of transformers; 37 mi. of 44-kv. transmission lines; an estimated 250 mi. of 11-kv. distribution lines, and 2,500 additional meters.

Planned for this year is reconstruction of 4,300 ft. of 11-ft., wood-stave flow-line near Grace. Generation is scheduled to be increased by the addition of 1,120 kw. in diesel capacity.

A new 20,000-kva., 161/44-kv. substation near Goshen is scheduled for completion this year, as well as a new 2,000-kva., 130/44-kv. substation near Malad.

Several new distribution substations and increased capacity at others will be installed as equipment becomes available. A 2,000-kva. mobile unit substation, to operate from 44 kv., has been ordered for 1948 delivery.

The foregoing gives total added generation scheduled for 1947. Other totals are expected to be: 81,000 kva. of transformer capacity; 4 mi. of 132-kv. transmission and 99 mi. of 44-kv. and 300 mi. of 11-kv. distribution lines, We estimate that the energy load will be 7.6% greater than in 1946. In general, availability of materials and labor continues to be the controlling factor with respect to maintenance and construction work.—*T. A. Purton, chief engineer.*

Washington

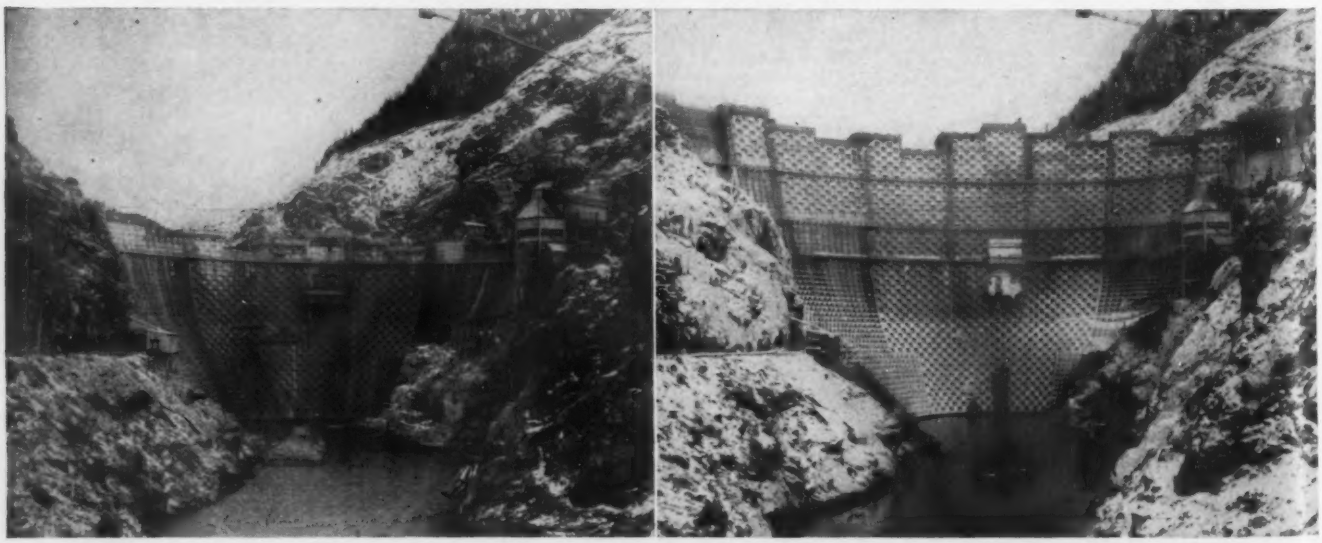
Columbia Basin Project, USBR

During 1946 contracts amounting to over $6,000,000 were awarded for additional facilities at the Grand Coulee power plants. In addition, contracts were awarded for six 1,600-cu.ft./sec. pumps and 65,000-hp. motors for Grand Coulee pumping plant. Construction was started on South Coulee Dam and on three large canals, and contracts were awarded for the construction of Long Lake and Potholes Dams. During 1947, work is to be accelerated on irrigation features of the project.

Puget Sound Power & Light

During 1946 we spent approximately $4,272,958 for new and improved facilities and have a 1947 budget of $5,500,000 for such work. Since we were unable to obtain equipment, ordered prior to or early in 1946, we were not able to make the improve-

Seattle City Light raised the crest of Ross Dam from 300 ft. above bedrock in January 1946 to 400 ft. at the year's end



ments contemplated for 1946, and hope to receive and install this equipment during 1947.

During the year we constructed or completed the construction of 72 mi. of transmission line, costing with terminal facilities $565,000. Seven distribution substations, with 18,000 kva. capacity and costing $213,000, were constructed and placed in service. Three line headquarters' buildings costing $100,000 were completed. The laying of 4 mi. of submarine cable costing $80,000 was completed. The figures are approximate.

Totals for the year included 78,975 kva. of added transformer capacity, 146 mi. of transmission (11-kv. and up), and 150 mi. of distribution. We received 10,000 new meters.

Load growth during 1945 and 1946 made it necessary to increase the capacity of 27 substation transformer banks. This was accomplished by the shifting of transformers, made possible by the purchase and rental of transformers and the use of spares.

It is planned to construct approximately 22 mi. of 110-kv. and 20 mi. of 55-kv. transmission lines, to construct 15 new distribution substations and increase the capacity of several more. We plan to replace overdutied breakers at a cost of approximately $100,000 and to modernize several others. We plan the purchase and installation of 15,000 kva. of capacitors. It is planned to convert several delta distribution systems to star and to interconnect several distribution stations now operating isolated.

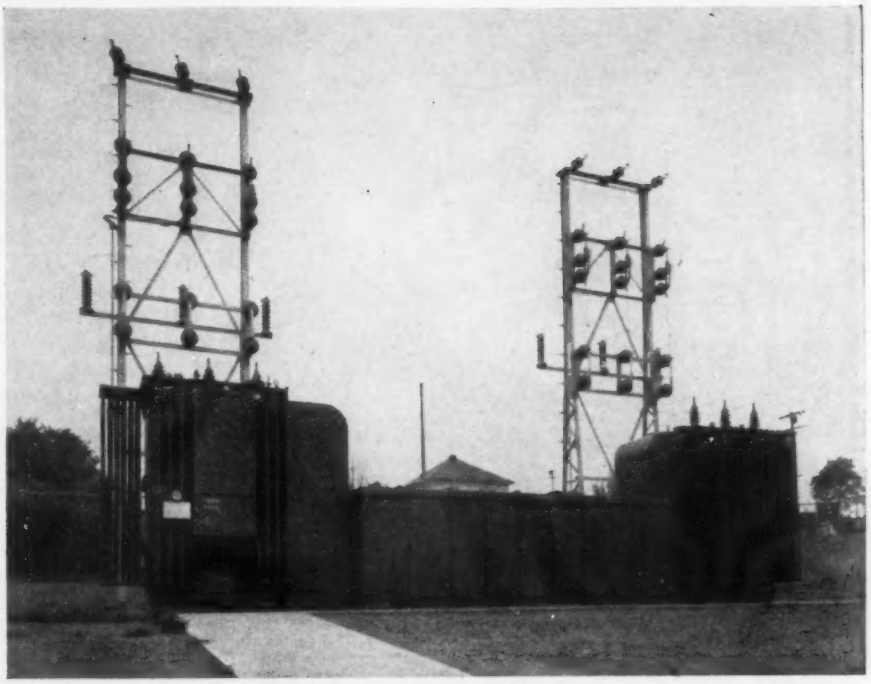
Anticipated additions are 66,583 kva. of transformer capacity, 127 mi. of transmission and 171 mi. of distribution.

We expect to add 10,500 customers and to experience a load increase of from 25,000 to 35,000 kva.—*Frank McLaughlin, president.*

Seattle City Light

The total 1946 expenditures for plant improvement amounted to approximately $5,640,000. The greatest portion of this, about $4,700,000, went into the construction of the second step of the Ross Dam. It is anticipated that the construction expenditures will be close to $6,500,000 for 1947, of which $4,350,000 will be for Ross Dam.

Progress on the Ross Dam project was satisfactory in 1946, and it is expected that the second step of the dam will be completed about May 1, 1947. It is planned to continue with the third step at that time, and completion of the dam at an elevation of 1,620 ft. is expected about May 1948. Total storage will then amount to 1,400,000 acre-ft., which will be capable of producing about 700 million kwh.



This 6,000-kva. unit substation supplying four 4,330-volt feeders on Seattle City Light's system is one of many such units; 1947 additions will total 45,000 kva.

No additional generating capacity was added in 1946 and none is scheduled for 1947. Preliminary engineering investigations are now being conducted for the addition of about 45,000 kw. to the Gorge plant. A very small part of this work will be accomplished in 1947. This installation will probably be ready for service in 1949.

About 8 mi. of 26,000-volt distribution lines were completed in 1946 and about 30 mi. of new lines are planned for 1947. Substantial additions to the 4,330-volt primary feeder system were made in 1946 and will continue through 1947. Further extensions to our distributing system in the form of 21,000 kva. of unit type substations were completed in 1946 and an additional 45,000 kva. is planned for 1947.

The number of electric meters on the city lines as of December 31, 1945 was 114,805 compared with 118,101 at the end of 1946, an increase of 2.9%. Although no figures are readily available on connected load, the net system energy for 1946 was 1.9% greater than in 1945. The system peak demand increased from 222,000 kw. in 1945 to 241,000 kw. in 1946. Correspondingly the annual system load factor dropped from 53.3% in 1945 to 50% in 1946. Our load estimates for 1947 constitute a 5% increase in energy and a 12% increase in peak demand with an annual load factor of about 47%.

One of the major problems in connection with our power supply is the necessity of drawing the Ross reservoir down to practically the no-storage point and holding it down for a period of from one month to six weeks for grouting operations on the dam. This is necessary in order to remove all loads and stresses from the structure during the grouting period. The reservoir was drawn down to an elevation between 1,290 and 1,300 ft. and maintained at that point from the first of February until the middle of April in 1946. The procedure must be repeated in February and part of March in 1947, and again in 1948 when the grouting operations will be completed.

Maintenance was stepped up somewhat in 1946. The three main generating units at the Gorge plant were given major overhauls. Maintenance will probably run higher for the next two or three years.—*E. R. Hoffman, superintendent of lighting.*

Tacoma City Light

In spite of postwar industrial readjustments during 1946, Tacoma City Light experienced a modest gain over previous years to establish a new high in system energy and peak requirements. This, coming at a time when transformers and line material are practically unobtainable, and delivery dates are set beyond the horizon, means that in most cases the growth was absorbed through further overloading of existing facilities.

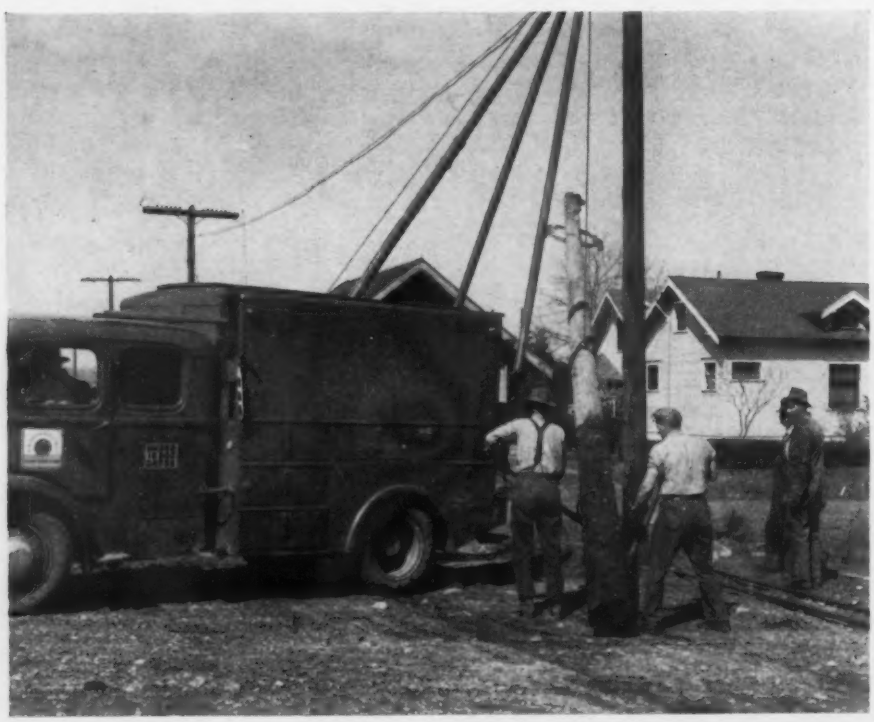
The system load amounted to approximately 871 million kwh., with a peak of 175,000 kw. Of this energy, roughly 7½% was purchased through

Alder dam and power house of Tacoma's second Nisqually development adds to the city's generating resources, which will be called upon in 1947 to serve growing loads, estimated to require 40,000 kva. of additional transformer capacity

interchange agreements with adjoining utilities. A decrease in the system annual load factor was noted, apparently due to the return of single-shift industrial operation, and to the higher demands incidental to the use of electricity for house heating purposes. In this latter connection it should be noted that electrical house heating, with its nominal 20% annual load factor, is the subject of growing concern among Northwest utilities.

Industrial plant construction now under way in Tacoma, and inquiries for increased power from existing customers, indicate a healthy increase will prevail in the coming year over 1946—providing the necessary equipment can be obtained to serve the load. It is expected that roughly 25,000 kva. in industrial substation capacity will be added in 1947; together with 15,000 kva. of residential, excluding distribution transformers.—*V. B. Jones, engineer.*

Resuming a program begun many years ago, Washington Water Power is moving poles from streets to alleys as distribution is converted from 4- to 13-kv. Last year, work went forward in the northwest section of Spokane



Washington Water Power

The Washington Water Power Co.'s construction budget for the year 1947 is $2,974,000 as compared to an expenditure for 1946 of $1,690,000. Delay in receipt of material, particularly street-lighting facilities, and difficulty in securing trained manpower curtailed the expenditures for 1946 somewhat. The higher expenditure for 1947 is due to a combination of rapid load growth together with heavy loading of facilities during the war period when conservation was necessary for war purposes.

Such lighting material as was received did permit a very satisfactory job of arterial lighting on North Monroe St., Spokane.

Ross Park substation was completed early in the year, adding 30,000 kva. rated capacity from 110-kv. transmission to the 13-kv. distribution network for Spokane. Almost half the 1946 expenditures were for lines, meters and transformers for new business made up of miscellaneous small jobs. This is a considerably greater percentage than normal for this class.

The Columbia Basin irrigation construction near Coulee City required the relocation of a part of our two main 110-kv. lines from Chelan to Stratford. Activity in road construction resulted in considerable moving of distribution lines.

An extension was made to the Pierce-Greer, Idaho area, a new territory, from the Orofino substation. This consists of 23 mi. of 60-kv. line and about 17 mi. of 13-kv. This will supply service to the town of Pierce and Headquarters Camp of Potlatch Forests Inc. in Idaho. Pin type insulators were used on the 60-kv., suspension type being unobtainable.

Fifteen miles of the old 60-kv. single-circuit line supplying the Mountain States Power Co. in Newport, Wash., and northern Idaho, was rebuilt, materially improving reliability of service to this area.

The distribution system in the Northwest area in Spokane was rebuilt, changing from 4-kv., wye ground, to 13-kv. wye ground operation, and moving pole lines from streets to alleys. This is part of a program initiated several years ago.

Similar rebuild work was under way in Lewiston, Idaho, and Odessa, Harrington, and Latah Junction, Wash., but was not completed.

An item of considerable interest was

the building of distribution facilities to take care of the housing projects for the state college at Pullman and the state university at Moscow. Service was supplied when required at both of these locations.

Approximately 300 mi. of rural lines were built in addition to the Pierce-Greer extension.

The major item in the 1947 budget is the East Side switching and substation for Spokane. Equipment for this station is scheduled for delivery during the year.

Rapid growth of load in the Spokane area made necessary the advancing of our plans for an additional substation from transmission to distribution voltage. Engineering studies have been largely completed on this, and the substation is scheduled for installation in 1948. A departure from our usual practice is the use of three-phase transformers, made possible by the fact that, with additional substations, an outage of a single substation can be picked up by overload on those remaining.

The budget calls for converting 380 blocks in Spokane from 4- to 13-kv. distribution. Similar increase of voltage and rebuilding of lines is projected for several of the cities and towns in the Inland Empire.

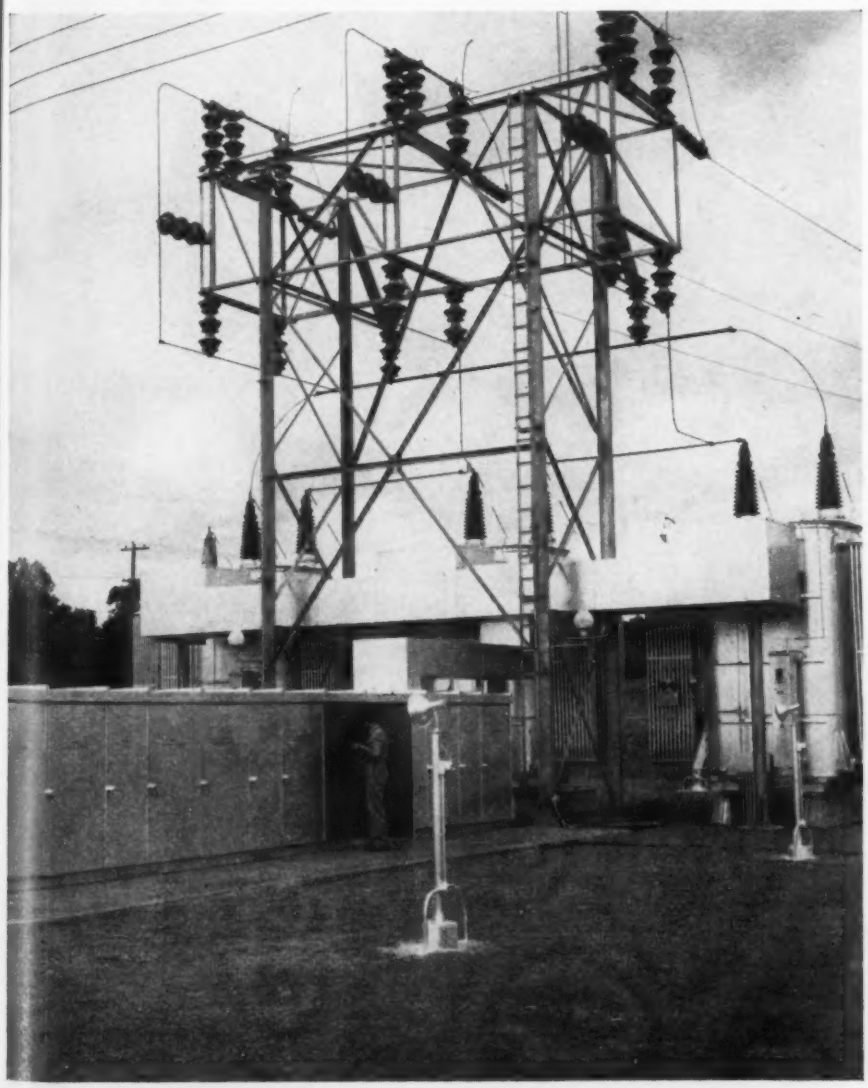
Approximately 300 mi. of rural extensions are projected for 1947.

Transmission construction will include the completion of the rebuild on the Pend Orielle 60-kv. line—approximately 25 mi. from Spirit Lake north to Newport. This will equip the entire line for later operation at 110 kv.

The 33-kv. line from Chewelah to Colville will be changed to 60 kv., and major shifting of transformers and the building of new substations at Addy and Colville will be undertaken.

Activities in the Columbia Basin and road changes throughout the area will again require considerable expenditure in moving lines.

Ross Park substation was 30,000-kva. addition to Washington Water Power system. Completed in 1946, it serves 13-kv. Spokane net from 110 kv.



The completion of the street lighting modernization planned for 1946 is a major item in the 1947 budget. A detailed engineering study was made and an over-all electric lighting program developed adapted to the different requirements of residential, traffic, and down-town lighting.

A third 13-kv. underground feeder and three new vaults, each with a 500-kva., 3-phase transformer, will be installed in Spokane.

A new 5,000-kva., 110/2.3-kv. transformer bank will be installed at Ritzville, and the 1,200-kva. bank at Ritzville moved to Odessa. Substation capacity at Colfax will be increased from 3,000 to 6,000 kva. Two 3,750-kva., 110/13,000, 3-phase transformers are on order and will be used to increase capacity at Latah Junction, Garfield, and Davenport.

Indoor 13-kv. circuit breakers at the Post Street substation will be rebuilt or replaced to give adequate interrupting capacity and improvements will be made to the bus structure. Fourteen 110-kv. breakers on the main transmission system will be rebuilt to increase short-circuit capacity and speed.

All critical materials for the work projected were ordered early enough to meet our requirements for 1947. Barring strikes or delayed shipment of materials, we expect to be able to carry out this program. — *J. E. E. Royer, vice-president and general manager.*

Wyoming

Missouri Basin Project, USBR

The Fort Peck power plant is operated by the Army Engineers with the Bureau of Reclamation charged with the sale of power. Late in 1946 a $3,289,000 contract was awarded for the construction of three transmission lines: Glendive-Miles City, Fort Peck-Williston, and Williston-Garrison. Construction was started on Kortes and Angostura Dams, and a contract awarded for the construction of Enders Dam. In 1947, contracts are expected to be awarded to start work on the Boysen and Anchor Dams. The Boysen Dam will be a key source for power in the Wyoming-Montana area.

Shoshone Project, USBR

Construction was started in 1946 on the Heart Mountain power plant with completion scheduled in 1947. The installation of pumping units during 1947 will make possible further use of the waters of the Yellowstone River in Montana.

Still Plenty Rugged for 1947 But What a Market!

WELL, it was rugged. But at that we didn't do so badly. That was the way 1946 added up, as expressed by many a dealer, distributor and maker of electrical equipment.

Now for 1947, what? Still plenty rugged, but different. A big shift coming from a sellers' to a buyers' market. Better labor situation in prospect even if there are lots of small strikes and threats of them. (It is beginning to percolate that those who strike lose.) More merchandise to sell but still some shortages and allocations. Price uncertainty.

Still a whale of a market, though. More choosey, perhaps, and demanding more from the seller. Salesmanship back in demand. But still a big market for every appliance. Still a big backlog of unsatisfied demand. A year more of obsolescence on the old appliance still in use.

Better appliances, new models, new designs, new features are in the works.

House building really booming. Released from confusing controls and artificial shortages, the floodgates opened, more and better houses will be built—better because materials will be better and standards of adequacy allowed to be raised. Home buyers not so desperate, will want to be pleased.

From what reasons spring such generalities?

From the figures furnished here by 50 of the electric utilities of the West. (and many thanks to them all for this mutually helpful exchange of facts)

From the national figures compiled by *Electrical Merchandising* and derived from manufacturers, trade associations and the Bureau of Census.

From previews of new products exhibited at the Eastern shows and markets last month.

From interviews with dealers, distributors, utility sales managers.

From watching the trends, the developments, the ebb and flow of the industry alertly throughout the year.

Then on with the facts and figures. They each mean something to the intelligent business man, the dealer who plans ahead and looks for road signs, the distributor alert to his market, the maker of appliances and even the far-sighted manufacturer of wire, switches, transformers and other equipment that feed the utilization device in home, store, office or factory. They are the pressure gages, these facts, the instruments by which the keen sales manager operates.

Customers—Population and pay rolls make customers. Both increased during 1946. The influx of people to the West continued. The combined increase in domestic customers in the eleven Western states amounted to 250,685 over 1945, which had recorded an increase of 66,000. This was the added number despite the housing shortage. This number of additional customers were served in the new houses finished, in subdivided older dwellings and in housing units, trailers or what have you.

Many thousands of the new customers had to be served direct, without meters, on flat rates based on estimated usage. There weren't enough meters. Every utility has a long list of customers waiting to receive service as soon as poles, wire, transformers and labor are available to run to them.

ELECTRICAL WEST asked the utilities to discuss this situation and tell what effect it was having on the potential market which dealers of electrical equipment and appliances sell to. Their answers will be found in the individual reports which follow. All who answered report a large backlog of requests for service and great delays in getting power equipment to meet the demand. Nearly all have established priority lists in order to be fair.

Commercial customers, too, increased in number greatly, as more and more stores and enterprises were started. The total of new commercial and industrial customers for 1946 was 57,128 compared to 20,000 in 1945. These figures do not represent the expansions that so many of the previous customers started in 1946. Restrictions on commercial building inhibited such expansions to some extent but it would be surprising if the figures for load increases to such customers could be compiled. The long pent-up desire to build and grow just about burst the bands of regulation.

Unfortunately there seems to be no way at present to arrive at the facts as to volume of lighting equipment, wiring installations, commercial refrigeration and commercial cooking that was done during the past year, but the volume was heavy. Perhaps after they can meet the demands of the customers hammering at their doors for electric service, the utilities may re-establish their statistical and market research work on behalf of the entire industry. A few companies do so, but there are not enough of them to give more than a sampling of what their own territory may be doing.

In the adequate wiring program, it was a case of marking time too. The 100,000 new home units which were needed at the beginning of 1946 were not achieved. Shortages of materials delayed building by months rather than weeks or days. Standards of house wiring were forced down to minimums in order to make the scarce

wiring materials equip more homes with a little wiring. Building permits for dwellings, 11 months, were 113,000; only 11,000 federal; total building, not public works, $1,043,000,000.

But 1947 looks better. Operation of a free economy again gives promise of more ample production of materials and with more volume, better efficiency in construction which should aid in reducing costs and in turn stimulate more building.

KWH Consumption—The average annual kilowatt-hour consumption per domestic customer has long been regarded by the industry as one of the best indices of electrical growth. Despite high averages last year, 1946 reports continued growth. Of the 50 utilities reporting, 39 now have averages of over 1,000 kwh., something that a few years ago was pointed to as unusual. Of the 39, 23 top the 1,000 mark but do not reach 2,000; seven have between 2,000 and 3,000; four between 3,000 and 4,000; three between 4,000 and 5,000 and one tops the 5,000 mark. That is Southern Nevada Power, serving Las Vegas, Nev., probably the highest in the nation, with an average domestic kilowatt-hour consumption of 5,816. Tacoma, with 4,500, Eugene with 4,400, and Seattle with 4,099 come next. In the 3,000 bracket are Northwestern Electric with 3,800, Washington Water Power with 3,767, California-Oregon Power 3,228 and Portland General Electric 3,197.

The table on another page lists the kwh. averages for the past five years for most of the utilities and indicates the growth each year. During 1946 increases of over 100 kwh. are common, many going as high as 200, 300, 400 and Southern Nevada Power 1,236. (If some of the figures reported here differ from those in the January issue of *Electrical Merchandising* it is because later figures have been sent ELECTRICAL WEST to correct estimates previously made with the actual figures at the close of the year.)

Eager dealers—like the Bureau of Radio & Electrical Appliances of San Diego—met in conferences to learn the score

Dealers—The number of dealers going into the sale of electrical appliances kept on growing in 1946, despite an increase from the 7,500 of 1941 to an estimated 12,800 at the end of 1945. Estimates given by the reporting utilities, with allowances made for those not reporting, would indicate that there are now 12,900 in the West, and there may be 680 more in 1947. However, post office returns of the ELECTRICAL WEST SALES GUIDE NEWS-LETTER during 1946 because the dealer addressed had gone out of business, would indicate that the number who enter may only balance the number who quit.

A recent *Wall Street Journal*, in an article of warning, predicted many failures or closings of electrical appliance stores throughout the nation, quoting figures of some typical examples of overexpansion in Eastern communities. In Philadelphia, it said, there has been 10% decrease of appliance stores already. There are no specific figures yet on Western closings nor do observations of the editors or the work of distributors indicate any such percentage.

The situation is going to be rugged, however, for dealers this year even with, and in many instances because of the increased flow of merchandise. Civilian Production Administration and Bureau of Census figures for production up to the end of October show steadily increasing quantities of appliances produced and shipped. The monthly average production of units, in 1940-41 for radios was 1,100,000 units—in October 1946 it was 1,800,000. Refrigerators had not yet reached the 1940 average of 309,000 but had shown a steady increase each month from 107,000 in June to 280,000 in October. Washer production by October had exceeded the 1940 average of 158,000 by rising to 265,000 units.

What dealers are up against can be visualized by a little study of one of the accompanying tables which divides

the number of dealers in each state into the figures which the utility companies estimate as the potential sales for the year of major appliances and which gives an indication of how many sales these figures represent, divided into the total customers served by those utilities.

Against this a look was taken into the 1938 figures presented in ELECTRICAL WEST's annual statistical and review number in February of 1939. The figures in one place were expressed in terms of number of sales made per 1,000 utility customers.

In 1938 the highest ratio of sales per 1,000 customers were as follows: *Ranges*—Idaho Power Co. territory, 119 per 1,000; California-Oregon 79; Sierra Pacific Power 62; *Water heaters*—Idaho Power 59 per 1,000; Copco 42; Seattle 30; *Refrigerators*—Pacific Power & Light 124 per 1,000; Copco 114; Tucson 115; *Washers*—Pacific Power & Light 119; Utah Power & Light 105; Northwestern 89; *Ironers* —Idaho Power 13; Pacific Power & Light 11, four other territories 10. The ratio then was one ironer to 6.1 washers.

It was on the basis of such figures that the opening statement of this summary was made—"Still plenty rugged, but different."

One of the *differences* that is also *difficult* is that appliances may come in greater quantity than the ability of utilities to serve them. This is particularly true of electric heating and ranges. Some of the utility sales and operating managers have been so bold as to say that many of the large manufacturers are getting the cart before the horse. They contend that steel and copper should be channeled into transformers, wire, hardware and substations rather than into appliance production.

In the pages which follow this theme is expressed by many of the utility executives. Their statements in some instances include such figures as are available on the volume of appliances sold in their territories in 1946. Wherever these are available they show that a surprising volume of appliances was sold last year, much more than the appearances would lead one to believe. That there are not more such figures to report is because only a few companies have maintained or re-established the asking of reports from dealers for compilation into area totals.

The dealer program of each utility has been compressed in a few words in one of the tables. Others were explained in more detail. Still others were explained more fully in *Electrical Merchandising*. Some reports graciously sent in by utility executives were received, unfortunately, too late to be printed in this symposium and may be run in the next issue because they contain valuable data or details of changes in program not previously reported.

On the whole the year 1947 will be one of the most challenging ones ever faced by the electrical industry. There

Customers and Consumption

UTILITY TERRITORY	Average Annual kwh. Consumption—Residential— 1946	1945	1944	1943	1942	Customers—Residential Customers 1946	1945	Farm Customers 1946	1945	Commercial Customers 1946	1945	Total 1946
Aberdeen, PUD No. 1	1,800	...	...	...	...	9,551	9,343	2,000	1,837	...	...	...
Alameda P.U. Dept.	1,480	1,416	1,344	1,256	1,201	12,370	12,358	...	...	...	1,156	...
Anaheim L. & W. Dept.	...	750	700	...	...	3,677	3,465	...	...	947	880	...
Arizona Edison	1,100	...	...	...	...	14,100	13,515	150	100	...	3,639	...
B.C. Electric Ry., Vancouver	1,318	1,100	1,089	1,025	932	95,500	92,986	26,000	22,463	18,325	...	...
B.C. Electric Ry., Victoria	1,336	1,218	1,062	952	869	21,403	20,386	5,771	4,844	3,897	...	...
Calif. Elec. Power	1,476	...	1,300	1,259	1,328	30,000	28,550	3,800	3,500*	5,800	5,050	...
Calif. Oregon Power	3,228	2,886	3,024	2,909	2,706	41,176	37,838†	414	396	9,386	8,500	...
Calif. Pacific Utilities	...	1,664	1,494	1,413	1,305	15,200	13,824	975	850	...	1,095	...
Central Ariz. L. & P.	1,569	1,452	1,324	1,070	1,140	40,527†	36,037†	...	...	6,699*	5,691	...
Cheyenne L. Fuel & P.	1,400	...	...	...	...	8,900	8,300	250	200	...	...	...
Coast Counties G. & E.	1,250	...	943	871	...	26,375†	24,860	1,845††	1,662	4,790	...	...
Colorado Springs P. U. Dept.	1,092	1,190	1,142	1,002	...	14,806†	13,900†	...	...	...	3,150	...
El Paso Elec.	1,557	1,445	...	1,315	1,259	34,638†	32,238†	...	...	5,567	4,973	...
Eugene Water Board	4,400	3,800	3,424	3,269	2,993	11,500†	10,387†	...	...	...	1,440	...
Frontier Power	761	...	...	661	638	6,521	5,573	...	...	...	...	...
Glendale P. S. Dept.	1,400	1,320	1,291	1,162	1,084	28,000	27,577	...	...	...	3,750	...
Hawaiian Elec.	1,932	1,791	1,647	1,567	1,389	48,958	47,299	...	...	12,058‡	10,300	60,016
Idaho Power	2,900	2,550	2,457	2,361	2,137	51,540	48,437	23,160	21,180	...	11,200	...
Imperial Irrig. Dist.	...	...	2,078	2,078	...	...	...	...	...	...	...	...
Logan, City of	...	2,334	2,258	...	...	...	3,219	...	...	...	416	...
Los Angeles Dept. W. & P.	1,375	1,220	1,135	1,023	977	475,200	470,285	...	...	...	90,700	...
Modesto Irrig. Dist.	...	2,250	2,148	2,000	...	...	5,264	...	6,426	...	2,350	...
Montana Power	1,325	1,165	1,117	1,081	...	83,917†	75,849†	5,387	...	13,336	12,350	...
Mountain States Power	2,100	1,875	1,763	1,684	1,534	56,000	51,208	12,000	10,378	13,800*	9,100	...
Northwestern Elec.	3,800	3,210	2,950	2,734	2,180	41,500†**	42,401	...	...	...	7,030	...
Pacific G. & E.	1,495	1,345	1,227	1,137	1,068	692,804	671,854	196,600	180,361	162,360	148,036	...
Pacific P. & L.	2,673	2,150	1,978	1,895	1,765	57,258	55,346	20,540	13,856	12,319	...	...
Pasadena L. & P. Dept.	1,380	1,280	1,241	1,080	1,050	29,414	29,212	...	...	...	3,410	...
Portland Gen. Elec.	3,197	2,633	2,373	2,218	1,935	148,482†	145,612†	...	57,215	16,662*	16,550*	166,642‡
Provo P.U. Dept	2,412	...	1,368	1,374	...	7,168	6,577	...	...	...	...	...
Public Service of Colo.	1,087	975	906	857	781	126,000	121,391	7,500	6,381	...	19,000	...
Pub. Ser. of N.M. (Albuquerque)	900	...	...	...	...	21,000	19,000	...	...	...	...	...
Public Ser. of N.M. (Deming)	885	...	...	...	...	888	821	200	190	...	...	...
Pub. Ser. of N.M. (Las Vegas)	830	...	...	...	...	2,080	1,930	...	...	...	...	...
Public Ser. of N.M. (Sante Fe)	880	...	...	...	...	5,000	4,500	100	...	...	...	...
Puget Sound P. & L.	2,660	2,685	2,389	2,262	1,997	231,000	224,000†	...	...	28,400	23,300	...
Raton Public Service	...	1,038	...	...	...	...	1,686	...	...	...	503	...
Riverside L. Dept.	1,800	1,260	1,200	...	...	12,000	11,530	...	...	...	1,385	...
Salt River Valley Water Users.	2,200	...	...	...	...	13,349	11,184	496	386	125*	...	...
San Diego G. & E.	1 430	1,320	1,246	1,135	1,074	115,000†	110,771†	27,600	...	19,600	17,500	140,700
Seattle City Light	4,099	3,556	3,246	2,993	2,612	90,400	89,501	...	...	...	11,900	...
Sheridan County Elec.	960	851	824	803	...	4,175	3,910	1,000	878	...	650	...
Sierra Pacific Power	2,520	2,257	2,066	1,856	1,738	16,500	16,240	575	564	...	2,456	...
So. Calif. Edison	...	1,216	1,146	1,070	983	545,650	516,295	26,350	25,702	...	65,363	...
So. Colorado Power	1,300	1,148	1,124	1,047	991	24,000	22,827	2,500	2,320	...	3,173	...
So. Nevada Power	5,816	4,580	4,534	...	...	6,370	5,875	...	...	1,847	1,410	...
Tacoma, City Light	4,500	4,178	3,640	3,402	2,852	...	39,991	...	...	...	4,312	...
Telluride Power	850	850	800	800	...	5,100	4,600	950	900	...	675	...
Tuscon G. E. L. & P.	1,431	1,275	1,711	1,137	...	10,498	10,178	10,239	8,879	3,664	2,200	...
Unitah Power	729	925	875	752	800	900	863	...	200	...	370	...
Utah Power & Light	1,770†	1,559	1,386	1,328	1,243	127,526†	122,224†	...	...	13,724	12,386	...
Vallejo E. L. & P.	1,248	...	...	1,048	1,024	11,261	11,356	...	...	...	...	...
Washington Water Power	3,767	3,168	2,661	2,708	2,369	69,000	68,355	13,700	11,979	...	11,443*	...

* Includes Industrial. † Includes farm customers. ‡ See accompanying report for explanation and interpretation. ** Excludes Cowlitz County property sold to PUD. †† Agricultural power only.

Mrs. James Clark, a new customer, is being given information about Phoenix in booklet presented by Home Service Advisor Theresa Edwards, CAL&P Co.

is no cause to be pessimistic about it even if it proves hard to navigate. There will be a premium on good sound management and intelligent decisions—that premium will be survival and probably profitable business. If 1947 is faced with realism and optimism it should prove exciting, interesting, energetic and profitable. Once more the individual is on his own. It is his to make the most of his freedom.

Arizona

Central Arizona L. & P.

Regarding shortages of materials in these days of multiple extensions, I am sure all utilities are having the same problems and are working out programs for explaining the situation locally. We have no actual figures or dependable estimates on appliance sales for 1946 but before 1947 is over we hope to have completed a survey which will give us a brand new start on saturation statistics. We hope, too, that by the end of the year we will have been able to start getting regular reports from dealers again. Currently we are more concerned with how we are going to get juice to all of the appliances, rather than how many of them are being sold.—*Milton G. Sanders, vice-president in charge of sales.*

Tucson G.E.L. & P.

It is hardly necessary to state that shortages present quite a problem to us. We are meeting this situation as best we can by installing and cutting in domestic service on a flat rate basis. The Arizona Corporation Commission permits this procedure on a $3 per month billing and allocating to the bill the number of kilowatt-hours that can be bought for this amount. This method, although not too satisfactory, does permit us to handle a reasonable number of new service applications each month. The flat rate of $3 applies only to a house using lights, refrigeration and incidental appliances. Where a range or water heater is involved, an additional amount for each of these items is added. The obvious solution to the shortage problem is for the manufacturers to produce the required materials. Should this become a reality, the utility industry could overcome, in a short while, many of the problems that are bothering us at present.—*A. R. Seaman, commercial manager.*

California

Anaheim L. & W. Dept.

Our company has no commercial cooking, lighting or agricultural programs, leaving these to local merchants. So far we have been able to serve new consumers but we realize more material must be made available to the power industry, if we are to continue serving additional new consumers. This is particularly true regarding transformers, poles, wire and meters. It is imperative that everyone work together so that this material will be in greater supply.—*V. W. Hannum, superintendent.*

Coast Counties G. & E.

As of Nov. 30, 1946, we had a total of 26,375 residential customers, 12,060 being within incorporated areas and 14,315 on the outside. The consumption per domestic customer in the incorporated areas is indicated at 958 kwh. for the year, whereas in the rural routes, the average consumption per customer is 1,557 kwh. We have a total of 1,845 agricultural accounts averaging 13,247 kwh.

Our lighting and agricultural programs are well under way, with specialists employed in each field to offer assistance to dealers and to individuals as well. These specialists make lighting layouts and recommendations for architects, electrical contractors and individual builders. We are watching the fluorescent program very carefully and have succeeded in influencing many jobs toward higher light levels when incandescent was being replaced. Our agricultural power specialist works with the county farm advisors, farm bureaus, granges, 4-H clubs as well as with agriculturalists, in a broad program of better farming through electricity.

Any statement as to the effect of material shortages on our ability to serve new homes probably would be merely repeating the wail of all other utilities. The fact that we have not been in a position to serve major appliances, such as ranges, water heaters and house heating equipment, due to lack of transformer capacity, has served our butane competition well. Many tank gas installations have gone in following our inability to serve a customer who approached us with his mind made up for an electric home. The adverse effect on dealers and general promotional programs is well known and I don't suppose I can add anything to the story.—*R. L. Hayden, sales manager.*

California Electric Power

Appliance sales for the year 1946 (December estimated) totaled 404 ranges, 479 refrigerators, 686 water heaters, 419 200-volt air heaters and approximately 700 miscellaneous appliances, including washers, ironers and desert coolers. An interesting thing about these figures is the preponderance of water heaters, which is reversal of usual appliance sales. This

Measurements of the Market—Saturation and Estimated Sales 1947

Utility Territory	Estimated Present Saturation—Per Cent								Estimated Sales in Units, 1947							
	Ranges	Refrig.	Water-H.	Washers	Ironers	Radios	Vacuum Cleaners	Refrig.	Ranges	Water-H.	Home Freezers	Washers	Ironers	Radios	Vacuum Cleaners
Alameda P.U. Dept.	60	22	2	60	20	70	80	600	500	20	20	1,100	100	2,000	2,000
B.C. Elec. Ry., Vancouver	23	16	4	60	3	90	65	6,750	3,000	2,000	100	5,000	500	20,000	3,000
B.C. Elec. Ry., Victoria	18	14	4	58	2	88	61	1,000	700	300	25	1,100	150	3,000	500
Calif. Elec. Power	80	17	15	55	10	100	40	2,500	1,300	1,000	500	1,800	300	2,000	
Calif. Ore Power	75	45	40					7,500	8,000	6,000	500	3,400	500	1,500	2,500
Calif. Pac. Utilities	80	39	18	89	5	96	70	1,750	800	900	100	850	150	2,500	1,200
Central Ariz. L. & P.	70	10	5	70	2	85									
Cheyenne Lighting, Fuel & Power	50	10	2	50	20	90	75								
Coast Counties G. & E.	75	10	5	25	5	99	75	3,000	500	200	500	15,000	500	5,000	5,000
Colorado Springs P. U. Dept.	60	15	10	65	12	89	87								
Eugene Water Bd.		60	30					3,000	1,000	250					
Glendale P. S. Dept.	65	12	2					10,000	5,000	4,000	1,000	10,000	1,000	40,000	1,500
Hawaiian Elec.	82	23	15				8	11,487	6,431	3,071	700	8,000	1,500	14,650	2,600
Idaho Power	80	60	30	65	5	95	75	75,000	7,500	4,800					
Los Angeles Dept. W. & P.	70	6	3						7,500	3,000					
Montana Power	72	28	2	69	9	85			3,100	1,500	4,000	72,000	14,000	200,000	35,000
Northwestern Electric	80	47	24	95	13	100	75	85,000	8,000	5,000	1,250	9,096	2,694	18,000	6,746
Pacific G. & E.	71	9	5	70	10	96	65	7,832	4,972	3,667	300	800	2,000	10,000	3,000
Pacific P. & L.	65	32	26	74	10	97	59	7,000	700	400					
Pasadena L. & P. Dept.	69	8	3					18,000	12,000	9,000	5,000	17,000	4,000	20,000	8,000
Portland General Elec.	65	45	25	65	24	105									
Provo P.U. Dept.		20	10												
Public Service of Colo.	55	6		65	8	85	75								
Public Service of N. M. (Deming)	60	10		30	5	85	60	200	10	5	20	150	50	400	200
Public Service of N. M. (Santa Fe)	75	10		85	2	90	50	200	25		50	300			200
Puget Sound P. & L.	64	42	20					30,000	15,000	14,000	10,000				
San Diego G. & E.	78	7	5	67	7	98	75	18,000	2,250	2,000	2,500	15,000	5,000	30,000	8,000
Seattle City Light	68	65	45	84	14	85			6,000	6,000					
Sheridan County Elec.	70	10		60	1	95	65								
Sierra Pacific Power								2,200	1,600	500	300				
So. Calif. Edison	65	9	3	40		100	40	40,000	10,000	5,000	10,000	50,000	10,000	75,000	75,000
So. Colorado Power	75	22	5	65	2	90	45	3,000	500	750	100	2,500	500		1,000
So. Nevada Power	85	65	65	85	5	100			250	250	50	600	50	500	300
Tacoma City Light		57	46					200	200	100					
Telluride Power	50	17		90											
Tucson G. E. L. & P.	75	9	3	45	2	98									
Utah P. & L.	75	40	7	87	3	100	75	10,000	4,000	2,500	500	7,500	1,000	18,000	5,000
Washington Water Power	74	38	33	58	7	92	84	12,000	5,000	4,000	2,500	15,000	4,500	15,000	5,000

can be attributed entirely to our ability to get water heaters when both ranges and refrigerators were extremely scarce. We still are faced with a tremendous backlog of customers desiring service, but are hopeful that we will be able to get caught up at least by mid-1947.—*W. S. Fleming, sales manager.*

Los Angeles Dept. of W. & P.

It is generally accepted that opportunities for extensive load building during 1947 will be greater than ever before experienced. In line with this thinking we are gradually increasing our personnel and conducting job training programs for the purpose of thoroughly familiarizing employees with the various promotional opportunities.

In the residential field, we have maintained an advertising program designed to keep alive the interest in electric appliances. This will be increased and will utilize newspaper advertising, local trade publications, car cards, billboards and direct mail.

Appliance distributors will place equipment on the floors of our branch offices and all prospects developed will be divided among the dealers. A representative will call on each dealer, assisting him with a store and window display, modernization planning service, and coordinating campaigns which will be developed. A dealer salesman training school is in operation to assist dealers by providing trained sales people.

The increase in dealerships over the prewar period has been exceptional and is still continuing but at a slower rate. There are about 700 electrical dealers and merchant plumbers franchised to sell major appliances. The present rate of increase about eight per month. The rate of increase or decrease in 1947 will depend on the quantity of appliances available. We cannot feel that all these dealers will continue profitably in business after current pent-up demands are satisfied.

The sales story on domestic appliances and adequate wiring is being presented to owner and speculative builders by our territory representatives and home planning advisors who assist them with kitchen planning, appliance information, lighting and adequate wiring service. Owner builders are further assisted through home planning institutes presented in connection with public schools and organizational programs. Our wiring reimbursement policy will continue for ranges and water heaters.

The department is encouraging the establishment of a high standard of

business ethics among the electrical appliance and equipment trade channels. Support is being given the Southern California Radio & Electrical Appliance Assn.

In the commercial field, sales campaigns are being developed which include direct mail advertising for commercial cooking, air conditioning and illumination. With much new building and modernization now in progress, very satisfactory results are expected from our promotion of these loads.

In the industrial field, we maintain direct mail advertising for the promotion of industrial heating and illumination. Preliminary surveys indicate strong interest by eastern industrialists in the establishment of branch plants in Los Angeles. A continuing program of solicitation of these prospects is anticipated, supported by some advertising in industrial, management and trade publications. We expect to continue the studies of natural resources, new industrial processes and markets as an aid to our industrial customers.—*Charles C. Snyder, business agent, power system.*

Pacific Gas and Electric

Shortage of labor and material has delayed construction of extensions required to serve a large number of customers. At the end of 1946, the company's total electric new business backlog involved 33,000 applicants, which to serve would require the construction of about 4,500 mi. of line.

Before the war, the average new business line construction was approximately 1,000 mi. of line per year. However, due to the early adoption of a priority system—whereby available materials and manpower were used to supply the most essential services—PG and E has been able to serve agricultural pumping plants, essential non-luxury industrial and commercial installations, urgent health and safety projects and new homes, with very slight delay. In a few congested locations, there have been delays—even in these essential classifications of service—which range up to 60 days. At the present time, all essential services described above are being served within ten days from the date the applicant's facilities are ready for service.

Material shortages principally involved are meters, transformers and certain types of line hardware. This material shortage situation could be alleviated by allocating a greater prorata of the manufacturer's production to the Pacific Coast area, where there has been such a tremendous population increase.

The shortage of trained technicians

How Dealers May Expect to Share the Estimated Market

IF —the appliances are available for you to sell, and

—the estimates of the number that can be sold are reasonable. (They were made by the 50 utilities reporting here) and

THEN —you divide the number of dealers into the number of appliances estimated that can be sold, and

—you divide the number of appliances into the number of customers these utilities serve.

—the figures below will give your prospects for sales of these appliances during 1947. Of course, these figures are theoretical averages, only, but do give you something to think about in relation to YOUR competition.

Sales potential estimates in number per dealer and in ratio of 1 sale per each of the number of customers below

	DEALERS																							
	No. Pre. War	No. Now	% Increase	No. of Customers per dlr.	Refrigerators dlr.	Refrigerators cust.	Ranges dlr.	Ranges cust.	Water Heaters dlr.	Water Heaters cust.	Freezers dlr.	Freezers cust.	Automatic Washers dlr.	Automatic Washers cust.	Convent. Washers dlr.	Convent. Washers cust.	Ironers dlr.	Ironers cust.	Radios dlr.	Radios cust.	Cleaners dlr.	Cleaners cust
Arizona	250	355	42	204	...	...	...	...	...	...	...	...	...	...	...	...	..	...	...	...	...	...
British Columbia	141	385	278	387	20.1	19.0	9.6	40.3	5.9	64.8	.3	1,192.0	2.8	135.4	12.9	29.8	1.6	229.2	59.7	6.4	9.9	42.5
California	2,699	5,367	90	417	44.0	9.3	5.8	67.8	3.5	112.6	3.9	94.7	8.4	44.0	23.2	16.2	7.1	53.0	72.0	5.2	28.9	12.9
Colorado	157	280	193	380	...	8.8	...	53.0	...	35.3	...	2,650.0	...	53.0	...	13.7	..	...	...	...	...	26.5
Hawaii	75	180	140	270	...	4.8	...	9.7	...	12.1	...	48.5	...	16.4	...	19.4	..	48.5	...	1.2	...	32.3
Idaho	410	500	22	150	22.9	6.5	12.8	11.6	6.1	24.3	1.2	106.6	2.0	74.7	14.0	10.6	3.0	5.1	29.3	...	5.2	31.0
Montana	1,102	1,200	75	70*	...	...	...	11.1	...	27.7	...	...	...	...	...	...	..	...	...	...	...	...
Nevada	71	117	75	199	25.6	7.8	15.7	12.3	6.4	31.1	3.0	66.7	8.0	31.5	16.0	15.7	2.0	126.0	20.0	12.6	6.0	31.0
New Mexico	14	29	107	416	15.9	15.5	1.5	176.8	10.2	1,291.6	3.0	88.4	2.1	21.7	15.9	15.4	2.1	21.7	15.9	2.7	15.9	5.2
Oregon	614	820	33	382	76.2	7.3	40.9	9.9	29.2	13.8	16.4	34.0	17.6	31.7	43.0	12.8	10.4	41.6	64.1	8.7	31.3	17.8
Utah	112	921	89	142	11.7	12.6	4.9	30.2	3.1	49.5	.7	244.7	1.3	107.9	7.4	19.4	1.2	120.8	21.0	6.9	5.9	24.8
Washington	870	1,537	76	278	20.2	7.6	20.1	15.1	17.7	16.9	11.3	27.5	7.5	35.9	33.9	7.9	12.3	21.9	56.9	4.7	20.2	13.4
Wyoming	17	34	100	421	...	...	...	...	...	..	...	...	...	...	...	...	..	...	...	...	...	...

has been partially met by establishment of training schools for estimators and linemen. However, we are still experiencing a general shortage of skilled help for surveying, estimating and the labor classifications required for construction of extensions.

Sale of appliances during year 1946:

Appliance	Units
Refrigerators	28,542
Ranges	5,577
Water Heaters	5,422
Home Freezers	1,336
Washers	31,830
Automatic... 8,842	
Conventional 22,988	
Ironers	3,421
Radios	100,169
Vacuum Cleaners	20,212

—O. R. Doerr, general sales manager.

new ranges, the balance gained through influx of population. The water heater gain was only 63. This ratio is not expected to remain the same, but probably will go to three-to-one some time in the near future.

Inquiries which we are receiving daily lead us to believe that during the next few years the use of electricity will increase many times over any period experienced.—*E. L. Bettannier, general manager and chief engineer.*

San Diego G. & E.

In 1947 our commercial cooking program will consist mainly of assistance to our appliance dealers in developing the demand for electric counter appliance sales to restaurants, drive-ins and small counter bars.

Our commercial lighting department was exceedingly busy all during the year 1946, preparing layouts and estimates for new lighting installations. We find that the demand from our customers for plans and specifications for improved lighting has been so great that it has required the entire time of all of our trained lighting engineers, and that we are at present having difficulty in keeping up with the actual requests for designed work. Our engineers make layouts and recommendations for the amount and type of lighting when requested by the customer. Three hundred and eighty-nine new jobs were laid out and recommended by our commercial lighting department in 1946. However, due to shortages of materials and labor, many of the customers have not been able to finish the installation as yet.

We have not developed a particular agricultural program. However, in 1945 we began the survey of extensions into our rural territories throughout San Diego County. Population increase in these rural areas and the construction of new homes and irrigation projects have been so rapid since the war that we are far behind in our efforts to serve all the areas which have made application. Our rural population has increased more than 100% within the last three years and the demands for service in these areas have resulted in a backlog of over 2,500 applications for service.

Since the war we have experienced a shortage of materials, manpower and equipment for the construction of new lines. On top of this we have had the greatest demands for new electric service ever experienced in the history of the company. About 50% of this demand for new electric service is occurring in our rural areas. The result is that we now have a backlog of 5,000 applications for service, about 2,700 of which are on rural extensions and require large amounts of pole line and construction materials.

Our materials situation has improved, but some shortages still exist in transformers and meters. Our labor and construction equipment situation has also improved so that at present we are beginning to make some gains in the number of installations over the new requests. Our company is doing one of the largest jobs of rural electrification it has ever accomplished in its history. During the last year we have constructed approximately 130 mi. of rural distribution lines, and, before the end of 1947, we expect to construct an additional 220 mi. of pole line in the rural areas.—*A. E. Holloway, vice-president in charge of sales.*

The West's Wired Homes and Appliance Saturation by States as Appraised by Electrical Merchandising

	Customers				Washer Saturation		Ironer Saturation		Range Saturation		Refrig. Saturation		Radio Saturation	
	Total Domestic and Farm Customers	Total Urban	Total Rural Non-farm	Farm	Washer Users, Gas and Electric	% of State Wired	Ironer	% of State Wired	Ranges, Total Home	% of State Wired	Refrigerators, Total Home	% of State Wired	Radio Sets, Total Home	% of State Wired
State	Jan. 1, 1947	Customers	Customers	Customers	Electric	Homes	Users	Homes	Users	Homes	Users	Homes	Users	Homes
Montana	111,654	57,689	38,877	15,088	90,974	81.48	8,802	7.88	27,277	24.42	70,923	63.52	137,000	92.4
Idaho	130,263	53,040	38,519	38,704	75,792	58.18	7,062	5.42	47,259	36.28	81,645	62.68	131,000	92.4
Wyoming	49,624	25,411	17,325	6,888	33,257	67.02	4,135	8.33	5,575	11.23	28,045	59.37	66,800	91.4
Colorado	263,628	165,400	66,740	31,488	189,513	71.89	17,723	6.72	26,411	10.02	156,523	59.37	303,600	91.4
New Mexico	77,538	42,450	24,264	10,824	32,722	42.20	2,167	2.79	4,247	5.48	39,109	50.44	98,000	73.5
Arizona	114,755	55,175	49,740	9,840	73,273	63.85	6,563	5.72	8,672	7.56	69,295	60.39	139,900	82.4
Utah	148,872	87,710	38,202	22,960	142,789	95.91	11,903	7.99	47,292	31.77	108,060	72.59	159,800	95.9
Nevada	31,015	14,346	14,701	1,968	16,683	53.79	2,197	7.08	10,615	34.22	24,616	79.37	40,900	89.3
Mountain	927,349	501,221	288,368	137,760	655,003	70.63	60,552	6.53	177,348	19.12	578,216	62.35	1,077,000	88.9
Washington	558,270	331,747	153,051	73,472	381,597	68.35	52,473	9.40	197,165	35.32	342,456	61.34	630,000	94.5
Oregon	331,860	184,068	88,424	59,368	211,988	63.88	27,851	8.39	126,183	38.02	206,445	62.21	386,000	93.7
California	2,403,663	1,807,264	456,343	140,056	1,493,572	62.14	247,007	10.28	153,960	6.40	1,485,287	61.79	2,673,000	96.0
Pacific Coast	3,293,793	2,323,079	697,818	272,896	2,087,157	63.37	327,331	9.94	477,308	14.49	2,034,188	61.76	3,689,000	95.5
U. S. Total	31,015,000	21,225,520	6,509,480	3,280,000	19,847,000	63.99	2,059,000	6.64	4,027,000	12.98	21,440,000	69.13	33,998,000	90.4

Pasadena L. & P. Dept.

The effect of material shortages has definitely caused many problems for electrical dealers and utilities. Our peak load and kwh. sales are up approximately 25% and, with the three-year delay of generator equipment, we hesitate to do any promotion work at this time. From estimates gained during the past five months, it would appear that the annual residential kwh. use will reach 1,536 during 1947.

It is our belief that the large manufacturer should work out a well-balanced program, not only manufacturing appliances, but fabricating wire, transformers, generators and other equipment essential to the utility before taking on added loads brought through appliance sales.

We wired for 442 electric ranges during the calendar year of 1946, one of the largest years in the department's history. Of these, probably 200 were

Montana

Montana Power

We are concerned with the major appliance situation in Montana, and question if the Eastern manufacturers are fair to this state in the matter of allocations, particularly ranges, refrigerators and water heaters. What is needed is to know what appliance shipments from *all sources* are made into each of the Western states, the percentage of such shipments to present production and the comparison of these figures with those of some prewar year, unaffected by the transition from peace to war.

The electric range and electric water heater were pioneered in the West. Our markets for these items are the best developed in the nation. Rural extensions have greatly expanded this market. Customer acceptance is high. We feel that major appliances should roll into Montana in at least the same proportions as our prewar shipments were of total prewar production.—*D. J. McGonigle, general sales manager.*

Nevada

Southern Nevada Power

We have no programs for 1947 for the reason that we are hard put to meet demands for all classes of service.

As to the shortage of materials with which to serve, the answer is so obvious in the whole light and power industry that a comment from us would be unnecessary. Who isn't combing the land for equipment, due to the inability of manufacturers to make a dent in the demand (which is manifestly no fault of theirs)? And what utility would go outside of regular channels if it could be taken care of by manufacturers?—*S. J. Lawson, general manager.*

Oregon

Eugene Water Board

The transformer situation continues to be the bottleneck in Eugene Water Board's distribution system, according to a statement from R. B. Boals, general superintendent and secretary, to electrical dealers and contractors. Until the situation eases, the utility is limiting loading of present circuits as well as the number and loading of new extensions, and asks that it be consulted before a customer is promised service for a major appliance. In many cases, it can furnish minimum service only; is taking on range and water heating where transformer capacity permits. Space heating loads can be added only in rare instances and dealers are asked not to encourage sale of such equipment at present.

Pacific Power & Light

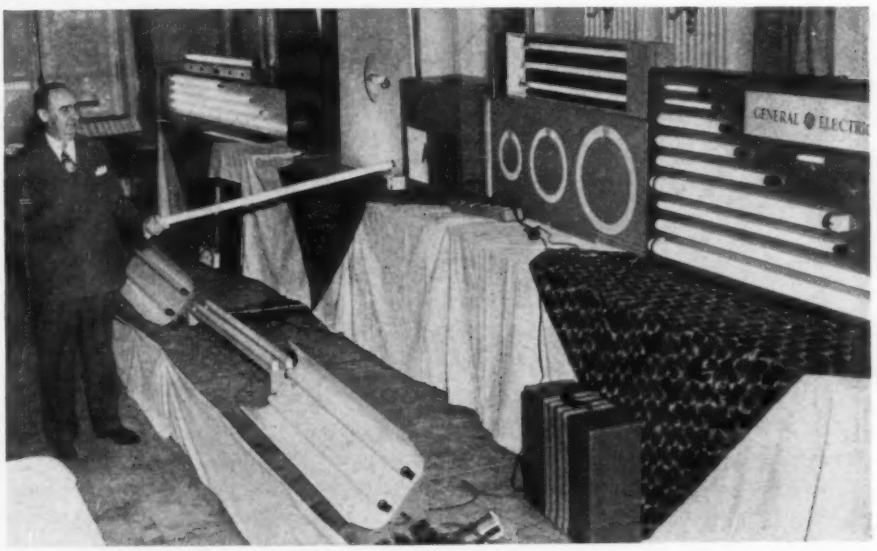
First of all, we agree with your notion that a frank statement as to the effect of material shortages, such as transformers, meters, poles, etc., also the shortage of skilled workers, on the ability of utilities to not only meet present demands for services but to carry out plans for handling future load additions should be made at this time. Such a statement backed by all branches of the industry would be of inestimable value in bringing about a better understanding on the part of the public relative to an over-all solution. The growing impatient attitude on the part of the public generally toward the inability of utilities to give immediate attention to demands for new or additional services is due largely to a lack of understanding as to the critical situation existing so many months after the war's end.

Of major importance to the utilities as well as those whom they serve is the problem of maintaining a proper balance between their efforts to take care of immediate needs for service and a long-range expansion program designed to keep pace with a fast growing area. This problem obviously is not confined to the electrical industry.

As to manufacturers and distributors of electrical supplies and manufactured products, it is believed that they are fully aware of the situation as it affects utilities and that their cooperation in the carrying out of a long-range program will be of very great assistance.

Retail dealers generally, as they become familiar with our problems, are cooperative to the fullest extent and we plan to work closely with them during the coming year.

We are sorry that we are not in a position to give you a detailed outline of our promotional plans for the year with respect to various phases of the program other than to state that emphasis will be placed upon dealer assistance.—*Guy E. Davis, domestic sales supervisor.*



Walter Potter, General Electric Lamp Department engineer, toured the Northwest during the past year holding educational meetings to show the new lighting tools available now to relight homes, stores, industry and schools

Mountain States Power

In our opinion the electric load in the territories served by the company will continue to increase in 1947 as appliances become available and to the extent the company is able to obtain materials, such as transformers, meters and the like. The company has been experiencing considerable difficulty in obtaining many types of equipment but expects such items to become more readily available in 1947 unless the country is beset with a series of strikes which would, of course, retard the scheduled construction program.

We estimate the company's kilowatthour sales for the year 1946 as follows: residential customers, 117,600,000; rural customers, 25,200,000; commercial customers, 42,900,000; industrial customers, 125,100,000 — *A. W. Trimble, vice-president and treasurer.*

Merchandising—Dealers—Policy—Home Service

	No. of Dealers							Home Service	
	1941	1946	1947	Yes	No		Dealer Policy in Brief	No. of girls	Program
Aberdeen, PUD No. 1.	12	15			X		Still in planning stage.		
Alameda P. U. Dept.	4	5	7		X		∫ Wiring for range, w.h., air heat, ads, display ⌇	0	None.
Anaheim L. & W. Dept.					X		⌇ space, 1/3 advt. cost, serv. after guar., prospects ∫		None.
Arizona Edison	52	85	85		X		Develop prospects, surveys, ads, demonst., cook schs.	1	General home service.
B. C. Electric Ry., Vancouver	125	300	325		X		∫ Exten. prog., advt. allowances, sales tng. bus. ⌇	10	Combined home service and
B. C. Electric Ry., Victoria	16	85	90		X		⌇ mgmt conf., display consultant, repair consul. ∫	3	home lighting, full program.
Calif. Elec. Power				X		∫ Ref. range, w.h. freezers, washers, iron- ⌇	Keep dealers competitive on wiring, financing, etc.	3	General home service work.
Calif. Oregon Power	135	160	175		X	⌇ ers, radio, air heaters, com. cooking ∫	When merchandise available—full program.		Announced later.
Calif. Pacific Utilities	63	101	101		X	As long as dealers build load.	Sales training, advt. program, other helps.		None.
Central Ariz. L. & P.	168	225	250		X		Promotion, surveys, training, sales assistance	7	General program.
Cheyenne Lighting, Fuel & Power	12	27	31	X		Ranges, ref., w.h., freezers, ironers, lamps.	Close cooperation with dealers.		None.
Colorado Springs, P. U. Dept.	7	20	20		X		None.		None.
Coast Counties G. & E.	30	41	46	X		Ranges, ref., w.h., freezers,	Dealer assistance, training, service, advt.	1	Demonst., dealer helps, kitchens.
Eugene Water Board	50	60	60		X		None.		None.
Frontier Power, Trinidad					X				
Glendale P. S. Dept.	12			?	?	Undecided as yet.	Promotional advt., direct mail, radio.	1	General.
Hawaiian Elec.	75	80	100	X		Full lines, plus com. cooking.	Electrical Development Advisory Service.	8	All round program.
Idaho Power	410	500	520	X	†	All lines, only when dlr. results inadequate.	Assist dealers to sell all ways.	3	Group demonstrations on all uses.
Los Angeles Dept, W. & P.	180	700	796		X		Range & w.h. wiring, training, displays, store plans.	7	Demonstr. in dealer stores.
Modesto Irrig. Dist.									
Montana Power	1,102	1,200	1,400		X		Training, engineering help, wiring advice, lists, etc.	12	Home serv., demonst., dealer help.
Mountain States Power					X		Will set up dept. for sales help later.		
Northwestern Elec.	229	250	250		X		Advt., prospect contact, other aids.	8	All round home service.
Pacific G. & E.	1,742	2,050	2,250	†		∫ Ranges, w.h., dryers, roasters, air heat, ⌇	Sales training, store layout, ads, promotions, commis.	24	Work with groups on Hq. & appl.
Pacific P. & L.	200	240	240		X	⌇ air cond. ∫	Advt., promotion, customer contact, training etc.	10	Full home service program.
Pasadena L. & P. Dept.	30	70	70		X		Range wiring, meetings, etc. advt.		
Portland Gen. Elec.	200	350	350		X		Store plan, training, sales assistance, ads.	2	Range demonst. to new users.
Provo P. U. Dept.	18	24	24		X		Dealer meeting, demonst. home service	1	Cooking schools.
Public Service of Colo.	125	215	240	X		∫ Ranges, w.h., freezers, ironers, lamps, ⌇	Dealer contact help, advt., wiring promot. training.	8	Home Hg. & cooking demonst.
Public Service of N.M. (Albuquerque)					X	⌇ blankets, dishwashers, disposals, ∫	None.		
Public Service of N.M. (Deming)	4	8	9		X	As long as dealers do a job.	Wiring asst., advertising, etc.		
Public Service of N.M. (Las Vegas)	2	4	4		X		Newsp. ads.		
Public Service of N.M. (Santa Fe)	7	15	14		X		Ads and dealer contact assistance, radio ads.		
Puget Sound P. & L.	300	637	550	*	X	Ranges & w.h. in Seattle only.	Contact, training, sales helps, campaigns, ads.	7	Group meetings.
Riverside L. Dept.	9	20	?		X		Ads., floor displays, promotional salesman.	1	When girl is found.
Salt River Valley Water Users					X		None.		
San Diego G. & E.	250	400	400		X		Ads and campaigns, demonst., prospects.	1	Not organized yet.
Seattle City Light				X		Ranges, automatic w.h., com. cooking.	Ads, any promot. subsidy extended to dealers.	3	Cooking schools, dealer training.
Sheridan County Elec.	5	7	7		X		Radio & newsp. ads.		
Sierra Pacific Power	65	92	107		X		Reno Plan. Promotion of dealer activity.	1	General.
So. Calif. Edison	400	1,800	1,800		X		Promotions, campaigns, training.	5	General.
So. Colorado Power	25	45	45	X		Full line, no radio.	Ads, promotion, training, group activities.	0	Looking for some.
So. Nevada Power	6	25	30		X		None.		None.
Tacoma City Light	80	320	320	X		Ranges, w.h.	Coop. meetings and ads.	1	Demonstrations.
Telluride Power	14	36	36	X		Full line, no radio or com. appl.	Meetings, offer facilities, demonstrations.	1	Cooking schools, lighting.
Tucson G. E. L. & P.	30	45	55		X		Plans not formed yet.		
Unitah Power	2	10	16		X		None.		None.
Utah Power & Light	800	1,511	1,500		X		Complete program with entire industry.	3	12 future, complete program
Vallejo E. L. & P.					X		None.		
Washington Water Power	290	340	340		X		Ads., direct sales & demonst. asst., training. etc.	7	∫ Demonst. in homes & dealer stores ⌇ Kitchen plans, cooking schools, etc.

* In Seattle only. † In low-use territory chiefly. ? Undecided as to policy as yet.

Dealer Bertoglio of Butte started spring with a new sign and remodeled quarters

Portland General Electric

In January 1946 the Clark County, Wash., PUD took over the company's Vancouver property and we lost approximately 5,059 customers of all classifications; therefore, while we showed a pretty fair increase (4,240) in number of customers, comparing Dec. 31, 1946 with Dec. 31, 1945, our 1946 figure would have been at least 5,000 greater with Vancouver.

We are unable to give accurate figures as to dealer sales of major appliances in 1946. Portland dealers, whose sales generally represent about 60% of those for the entire system, reported 2,766 ranges and 1,608 water heaters sold during the year. We know, however, that many dealers made no reports, particularly on water heaters. We get fair reports on range sales in Portland because we charge for the labor of servicing a range during the guarantee period if the dealer has not reported its sale.

On Nov. 23, 1945, we filed an all-electric home rate, open only to customers having both an electric range and an electric water heater in service. At the end of 1946 we had received 33,157 applications for this rate, 1,783 requests being received in the month of December alone. This figure, of course, does not begin to represent all of the water heaters on our lines. Due to somewhat different rate schedules in Salem, no Schedule 9 applications were received from that territory and we still have a good many thousand ranges on residential Schedule 8. As nearly as we can estimate at this time, our electric water heater saturation approximates 30% of our residential customers. The supply of electric storage type water heaters is steadily improving and we look for this item to be one of the leaders for dealer sales during 1947.

Like many other companies, we experienced load growth far beyond our forecasts for 1946 and we had the same difficulty in securing transformers, poles, line hardware and labor. Therefore we are considerably behind in providing service to new customers of all classifications. We feel that in general manufacturers and their wholesale distributors have done all they could under existing conditions to supply us with needed materials and equipment, but the quantities received have nevertheless been very disappointing. For lack of suitable transformers alone, we have at the present time in the Portland division some 340 customers waiting for complete electric house heating service. We are taking all house heating applications on an "if and when" basis, with no promise of service before July 1947 and then only if transformers and other necessary materials are available. We now have in excess of 1,500 complete house heating installations on our lines.—*A. C. McMicken, general sales manager.*

Snowville, Utah, celebrated the coming of electricity with a parade in which many dealers and Utah P&L had floats

Utah

Utah Power & Light

Specific programs for 1947 are not available at present since we will more or less mark time until conditions warrant the expansion of our activities. All figures submitted for 1946 include the company's subsidiary, the Western Colorado Power Co. Following is a record of dealer sales during 1946:

	Unit	$ Volume
Lamp Bulbs (crtns. of 6)	208,080	208,080.00
Portable Lamps	15,787	125,402.00
Other Lighting Fixtures	17,289	90,147.75
Home Ventilat. Systems	609	126,063.00
Residential Air Cond.	215	61,812.50
Heating Plants	2,663	581,865.50
Refrigerators	5,321	947,138.00
Ranges	3,214	462,816.00
Water Heaters	4,525	416,300.00
Radios	17,193	894,036.00
Table Cookery Devices	20,056	99,235.00
Other Heating Devices	28,057	137,170.00
Vacuum Cleaners	5,670	326,025.00
Clothes Washers	5,435	407,625.00
Portable Fans	1,225	9,800.00
Farm Devices	5,381	459,001.00
Other Motor Devices	12,499	141,644.00
Total		$5,494,160.75

—*W. A. Huckins, sales manager.*

Washington

Aberdeen, Wash., PUD No. 1

Received too late for inclusion in the tables was a report from Kelly Westrom, manager, Public Utility District No. 1, Aberdeen, Wash. Its dealer cooperation program is still in the planning stage. It plans to do considerable rural development work.

Estimates of unit sales by dealers, since the district does not plan to merchandise itself, are given for 1947 as follows: refrigerators 1,200, ranges 800, water heaters 1,000, home freezers 200, washers, automatic 300, conventional type 800; ironers 500, radio sets 3,500, and vacuum cleaners 700.

Saturation percentages are estimated to be 26% on ranges, 20% on water heaters.

Seattle City Light

We had an average of 22,783 all-electric residents, whose usage was 8,057 kwh. per customer, $83.80 annual revenue per customer, at average revenue per kwh. of 1.04c. Average for all residence customers was 4,099 kwh.; revenue $56.87; per kwh, 1.387c. Lack of equipment caused delay in doubling the number of all-electric customers—*P. C. Spowart, sales manager.*

Canada

B. C. Electric

Our home lighting program will include continuation of making out residential wiring plans and the adoption of a plan to keep architects, builders, electrical contractors, etc. advised of modern home lighting practices.

Our agricultural program will be a continuation of that used in 1946, with advisory service being given to farmers on all aspects of electrification and the use of electricity on the farm.

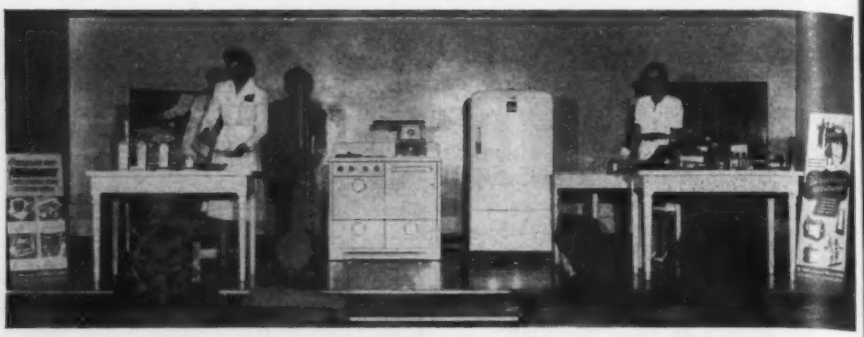
During the last few months we have developed some changes in the organization of the general sales division and have now divided the work up under three headings, these being, sales; New Westminster & Fraser Valley branches; and customer services. Our sales department under J. C. Munro as sales manager will direct the work of the light and power section, which, as its name implies, covers the field of commercial, industrial and residential power, and lighting, which, in turn, is divided up between residential, industrial, commercial and street lighting. He will also guide the activities of the gas sales department and the industrial development department which carries on our "Business is Moving to B. C." activity in all its phases.

The New Westminster & Fraser Valley branches, as the name implies, cover all activities in that part of our territory, under the management of A. P. Croker.

The third section dealing with customer services is under J. H. Taylor as customer services manager, and controls the activities of the residential services, agricultural services, application services, dealer development and liaison services. These titles are almost self explanatory. You already know that we ceased active merchandising last spring but our residential services personnel, numbering thirty in Vancouver, thirteen in the Fraser Valley, and six in Victoria and the lower part of Vancouver Island, still call on customers in designated territories, and among their duties is the spreading of reliable information regarding electrical appliances and the channeling of sales inquiries to dealers. The other services include advertising allowances, sales training, business management conferences, display consultant service, store planning and a repair consultant.

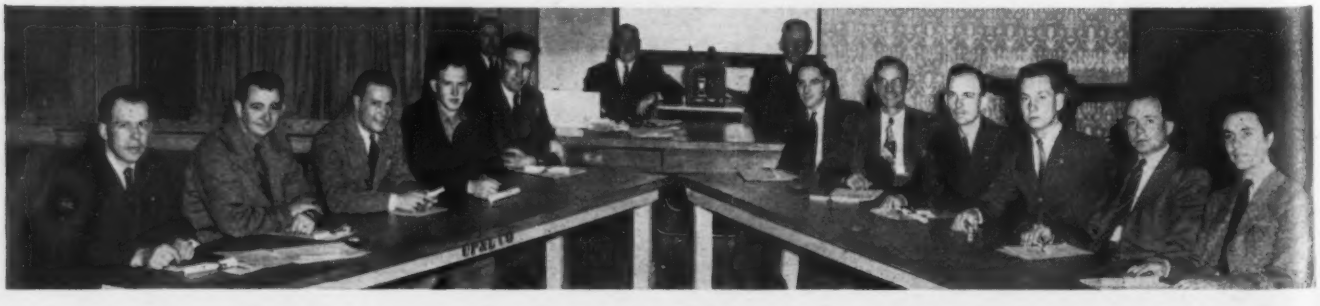
We are, in common with every other utility in Canada, suffering under the handicap of short supply of transformers and other equipment. The principal shortage is in weatherproof wire and it is, I believe, caused by a short supply of cotton, the majority of which we are told is being sent for use in Europe, and of braiding equipment when cotton is available. At the moment we have almost 2,000 rural customers, for the connection of whose premises construction orders have been issued, still awaiting service connections. Some of them have had their applications approved and money appropriated over fifteen months ago and we are consequently some times besieged with delegations asking for speedier service.

We have placed all these potential customers on a strict priority list so that there can be no jealousy and loss of our public relations, and we have written each one individually to give them their number on the priority list. In my trip to eastern Canada I found very little evidence of early improvement in the supply situation although



Frozen food preparation was featured by Frigidaire and Seattle City Light home economists to large numbers of interested homemakers during the past year

One of two sales training classes conducted at Ogden by Utah Power & Light, using EEI-NEWA basic course. These dealer salesmen include: Stanley Morrison, Don Blood, Vern Schoss, Elwin Dransfield, C. J. Wilkerson, Dale Willey, George Bergquist, Keith Read, Eldon Burgess, Howard Green, Kenneth Holmes. Instructor Vere Halliday, Delbert Foulder and A. N. Vendell, Ogden sales department, UP&L. Similar classes were conducted in several other cities



Mr. Ingledow, our vice-president and chief engineer, who is remaining in the East for another week or two to make calls on individual manufacturers, is hopeful that quantities for the West can be increased to some extent to bring us in line with utilities who live closer to manufacturers' doors and sometimes get quicker delivery.

We are short of meters and have many hundreds of customers on closed loops paying us on a flat rate basis. The action by our Wartime Prices & Trade Board, which has just allowed a substantial price increase for copper, lead and zinc, should materially increase the supply of these commodities, and we are hoping that the effect will very soon show itself.

Reported appliance sales for 1946, with the month of December estimated, are as follows:

Electric	
Ranges	1,696
Refrigerators	2,198
Automatic storage water heaters	1,007
Washers	3,712
Ironers	50
Radio sets	19,661
Suction cleaners	2,500
Total dollars volume reported electric appliance sales	$3,998,120.00

Notwithstanding the fact that there is still an apparent shortage of appliances because the market is still absorbing all deliveries, sales are at a tempo much above 1939. *H. N. Walters, general sales manager.*

Hawaii

Hawaiian Electric

Hawaiian Electric does not define commercial consumers in the same manner that many companies do, but we have, in addition to residential customers, 12,058 commercial, industrial, plantation, army and navy and others.

As for commercial cooking, while we have made certain installations and at present are working on others, we naturally have been handicapped on account of delivery. It is our intention, however, to put a commercial cooking specialist in the field Feb. 1, who not only will handle large installations but in addition will put a great deal of his time on promotion and sale of the so-called counter equipment.

Honolulu homemakers attend a demonstration of the Laundromat cycle washer

Our commercial lighting department is greatly handicapped because of lack of material. We have not as yet inaugurated a home lighting program and will not do so until we can back up this with merchandise stocks.

With regard to material shortages, we are in exactly the same position as everyone on the mainland, except that our situation is more acute. This has been occasioned by delay after delay in shipping and, of course, was brought to a head by the recent coast shipping strike; as a result we are worse off by three or four months than the Pacific Coast. Distributors and dealers in Honolulu have tremendous backlogs of firm orders and when merchandise begins to flow in regular and sufficient quantities, everyone should prosper.

The company's distributor-dealer coordination program is the direct responsibility of the Electrical Development Advisory Service, an independently operated office located in the Merchandise Mart in Honolulu, and headed by L. W. Clifford, who reports to C. E. Nolan, promotional manager for Hawaiian Electric. The 1947 program will include:

1. A continuation of the distributor-dealer sales training program as developed in 1946, using the EEI-NEWA materials.

2. It is planned that, by the end of 1947, the organization of the Electrical Assn. of Honolulu will be completed to include distributors, dealers, contractors, manufacturers and utility representatives.

3. The home service department will provide trained home service demonstrators to assist distributors and dealers on home demonstration on all major appliances sold by them.

4. The utility will issue a monthly bulletin, *Hanapu Kakou* (Let Us All Work Together), to all distributor-dealer personnel, including industry news, items of interest and instruction, and a "Dealer of the Month" citation to some outstanding dealer.

5. Monthly reports will be sent to the distributors of total industry sales on 13 different major appliances for the prior month, based on individual distributor reports to the Electrical Development Advisory Service.

6. Continuation of a counseling service to assist distributors and dealers in such matters as:

(a) Laying out adequate service facilities.

(b) Sound merchandise policies.

(c) Setting up sales control programs.

(d) Display floor layouts.

7. Continuation of a utility program of "use" advertising by newspaper and radio to stimulate markets for distributors and dealers.

8. Development of a coordinated program of product display for all distributors at the annual Honolulu Industrial Exposition and Farm Show to be held in April 1947.

9. A spring series of range "use" training schools for distributor and dealer salesmen. Instruction will be given by home service girls from Hawaiian Electric, using ranges of the make sold by the salesmen.

10. A coordinated program of action on the part of all distributors to train and assist all dealers in setting up and maintaining more effective floor display of merchandise.

11. Laying the groundwork for future association committee action on the problem of trade-in and resale practices, if such a real problem develops before 1948.

12. Continuation of the policy of free utility water heater and range service labor for all makes of water heaters and ranges sold on company lines by all distributors and dealers.

13. Counseling closely with all distributors on matters involving changes in the company's domestic user rate structure, or its sales or service policies, in order that all distributors and their dealers may be thoroughly conversant with such change and its possible affect on their normal ordering, merchandising, installation or service procedures.—*C. E. Nolan, manager, production department.*

Bureaus, Leagues

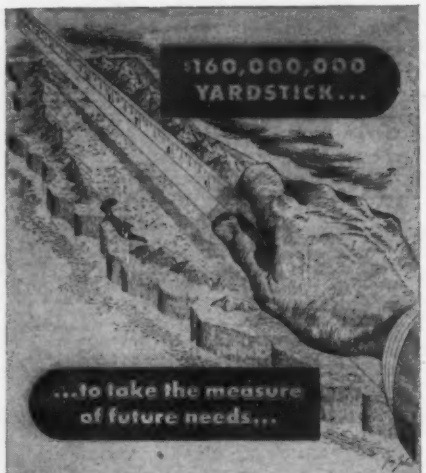
Northern California Electrical Bureau

The year 1946 was a transition year for the Northern California Electrical Bureau. In an appliance market which could have absorbed much more than was produced, no promotional efforts were necessary for the sale of appliances. Therefore, with a minimum staff and at a minimum expense, activities were devoted to continuing the bureau's long-range program on better lighting and adequate wiring, and for planning an all-out program against the time when market conditions require it. In addition, the bureau's radio interference service was maintained.

The bureau maintained a full-time lighting counselor who worked with and appeared before schools, civic groups and industry organizations in the interests of better lighting and better sight. In collaboration with the Sight Conservation Council and through close cooperation with the School House Planning Division of the California State Department of Education, considerable work was done and excellent progress made in raising the standards for lighting installations in California schools.

During the months of October and November an Empty Socket Campaign was conducted, featuring the slogan "Time to Re-Lamp—Buy Lamps now to fill all Empty Sockets." A special notice was mailed to some 1,600 lamp dealers, urging their tie-in, which was followed by personal deliveries of a colorful 14x20-in. display card and window banner. Two large newspaper ads were run in 410 daily and weekly papers and 600,000 tie-in stickers were placed on utility bills during the campaign. In some reports from the field there was indication of an increase in sales from 10 to 40% above normal.

During the year, arrangements were completed by the National Adequate Wiring Bureau, under which the Northern California Electrical Bureau becomes the certifying and promotional agency for the National Adequate Wiring Plan. A handbook entitled *Handbook of Residential Wiring Design—Single Family Dwellings*, containing the Northern California Electrical Bureau's adequate wiring specifications, was published and distributed to architects, building contractors and others interested in wiring specifications. In cooperation with two large banking chains, a pamphlet was prepared on home modernization, including adequate wiring, to be released at an early date by the two banks with their monthly statements.



One of many advertisements advising the public that the utility companies are increasing facilities as fast as possible to anticipate future needs

For more than a decade, the Northern California Electrical Bureau has carried on a program of consumer and specialized trade advertising. In 1946 this advertising was placed in 12 publications, some on full schedule, others being limited to only a few insertions during the year. Results checked by means of coupons offering free booklets were most gratifying. One advertisement on lighting offering the booklet, *Moving The Sun*, brought in 1,962 coupons, while another advertisement run in two publications on an adequate wiring booklet, brought in a total of 2,055 responses. Publicity stories at intervals augmented this program. A similar campaign is being planned for the coming year.

At the request of the National Committee on the Observance of the Thomas A. Edison Centennial, the bureau undertook to sponsor this observance in San Francisco and vicinity. Plans for this important event have been perfected and a complete program is well under way for suitable observance throughout northern and central California.

In anticipation of an all-out promotional program, progress was made during the year in organizing new units of the bureau in key cities and towns. New units were chartered in Marysville and Stockton. Additional units are in process of organization or affiliation in Eureka, Salinas and Monterey.

The radio interference department cleared 1,771 requests for its service. This work resulted in increasing the enjoyment of radio broadcasts by these hundreds of radio listeners, and increased satisfaction on their part with the service rendered by the electrical industry.

Plans for the current year include a program of sales training for dealers and their salesmen. It is proposed that the course include information for dealers on the selection and hiring of salesmen, as well as on their training.

Adequate wiring will receive maximum attention. Effort will be made to arouse all branches of the industry on the importance of all-out support of the adequate wiring program. Meetings will be held with manufacturer, wholesaler, appliance dealer and utility groups to enlist the support of every member of the industry in breaking the bottleneck of maximum electrical progress, inadequate wiring. Everything possible will be done to stress the importance of proper wiring, with architects, contractors and individual home builders.

Preliminary consideration has been given to a series of electrical shows to be held in key cities in northern and central California, slanted to the new home market, to develop the maximum use of modern electrical conveniences in the thousands of new homes to be built in the next few years. The timing of this effort is dependent on availability of major appliances. Other promotions will be undertaken as availability of appliances warrant.—*John S. C. Ross, chairman, Executive Committee.*

Southern Calif. Radio & Electrical Appliance Assn.

May we say that we have had a very fine year insofar as the association is concerned. Here are some highlights of our activities:

More than doubled our membership during the past year.

Conducted several very successful sales training and merchandising refresher courses in cooperation with the Department of Water & Power, and Distributive Education Department of Los Angeles city schools. There was a capacity attendance each time. Walter E. Elieson, assistant district manager, Los Angeles regional office, U. S. Department of Commerce, conducted the classes, which covered radio and appliance markets, capital investments, store front modernization, merchandise arrangement and display, sales organization, service departments, advertising, customer credit and financing. Assisting were Howard K. Burdick, supervisor of dealer relations, Los Angeles Department of Water & Power, and P. J. Swanson, supervisor of sales and educational programs for the same organization.

Established a group insurance plan which is working out extremely satisfactorily for the membership.

Held a very successful sales conference at the Ambassador Hotel in June, as well as the previous one in November.

We have been preparing, and are pretty well along with one of the finest trade directories ever assembled for this area. We hope to have this ready for distribution shortly. It will be complete in every detail, and certainly a material help to the industry at large.

Our first annual Christmas party sponsored by the association was very successful and enjoyed by close to 500 people, consisting of the members, wives, children and invited guests. This was held at Rodger Young auditorium, Dec. 23. Howard Burdick acted as Santa Claus and distributed gifts to the children.

Regular membership meetings are held; the first one this year will be Jan. 15, at which time nominations and election of the Board of Directors will take place. M. G. Sues, president Sues-Young Co., will talk on the subject of *Business Control.*

Another sales conference is in the planning stage. The conference committee, headed by Marshall Wells, is setting the plans for this event at the Ambassador Hotel, Thursday March 6. Speakers and details are not yet available.

On Sunday, Jan. 19, we will present our first association sponsored radio program over KMTC from 8:30 to 9 p. m. This will go on each Sunday evening thereafter at the same time. It is a direct tie-up with the electrical industry at large, and we know that this broadcast will do a lot of good.

Participation in the program is confined to members only and there will be five awards consisting of radios and electrical appliances each Sunday evening. The awards are made on the basis of the five best letters of 50 words or less received each week in which the writer tells what appliance he (or she) would like, and why. Title of this association-sponsored radio program is, *The Magic of Electricity.*

We are looking forward to an even more successful year during 1947.—WILLIAM J. QUINN, *Managing Director.*

Pacific Coast Electrical Bureau

To differentiate between the Pacific Coast Electrical Assn. and the bureau, the former is the industry-wide association which deals with the industry's affairs for the states of California, Arizona, Nevada and the Territory of Hawaii on a policy level. The implementing of any program or campaign is done by the bureau.

At the present time the bureau activity is confined to the promotion of adequate wiring and the correlation of codes and ordinances for uniformity, according to Victor W. Hartley, managing director. Thus it sponsors the Red Seal and Adequate Wiring certification program, and the uniform electrical code and the unsafe appliance ordinance.

The unsafe appliance ordinance has now been adopted by a total of 86 cities and one county in California. And 91 cities and three counties of the same state have adopted the uniform electrical code. At the present time the committee is studying the code to make it come into conformity with the National Electrical Code for 1947. Early it has been realized that very little revision will be necessary. It is found that the revision will consist largely of deleting parts of the previous edition which the new 1947 NE Code now incorporates.

As building of homes is being re-

Members' group ad in a community newspaper brings results. At right the first house to receive AW certification by the association. Walter Noss, Canoga Park Maintenance & Sales, contractor; Henry D, Raymond Rothman, builders

sumed, the importance of adequate wiring promotion has grown. It was also found that the certification program probably could best be handled more effectively through local organizations. But it was felt to be highly desirable that the same set of standards should be used throughout the region. After considerable work to correlate the views of both the combination gas and electric and the all-electric utilities, agreement was reached. The standards leave the inclusion of range and water heater circuits to the discretion of the home builder but require service capacity sufficient to accommodate future installation, in the standards promoted in combination territory. In the all-electric territory the range and water heater circuits are required.

Since the Northern California Electrical Bureau, the San Diego Bureau of Radio and Electrical Appliances, the Southern California Radio and Electric Appliance Assn., each in their respective territories, wish to carry on the promotional and certification program, the PCEB operates in remaining territory. The list of applications for certificates is long but lack of building materials has prevented many jobs from being completed in 1946.

Aggressive promotion of adequate wiring will be continued. One of the projects for 1947 is the production of a new promotional booklet to sell the value of certification. It will use pictorial as well as type treatment to tell why certification is needed, what it is, what the standards are and a room-by-room analysis of what adequacy means and will do for the home dweller, and by contrast, what inadequacy means in terms of inconvenience and lack of service and safety.

The power company gave support to the bureau's program on wiring with ads

Are you a Woman or a Furniture Mover?
A home is as modern... as convenient as its wiring. Only if you have plenty of convenience outlets will you be able to enjoy the advantages of the electrical living of tomorrow.
In building your new home 4% of the total construction cost should be set aside for adequate wiring, for 2 or 3 circuits will no longer carry the electric current needed in a modern home. Tell your contractor: "I want plenty of convenience outlets for all the lighting effects and fine new electrical appliances of the future. I want a modern home ... in which I won't be an outlet-hunting furniture mover!"
HUNGER IS AN ATOM BOMB!
Use less of the badly needed wheat, fats and oils ... substitute plentiful potatoes, eggs and vegetables. Starving people are not peaceful people.
SAVE A LITTLE AND SAVE A LIFE
PLUG IN I'M READY

Graduates of the San Diego Bureau's radio technician's course with their diplomas. They are: Victor Hall, Pt. Loma Radio; C. A. Kuhns, Sears; Delmar Ellis, Ellis Radio; Lewis Lewton, Dutton's; Henry Isom, United Radio; Paul Gorrell, Pt. Loma Radio. These men upgraded themselves from previous grades in a 3-year course and received the state's first radio trade certificates

San Diego Bureau Radio & Electrical Appliances

Perhaps the most active year in the thirteen year history of this organization was passed in 1946. Certainly this was true from the point of view of membership growth as well as the broadening scope of activities to meet the economic development of the post-war period. Most important, the bureau was able to be of more real service to its membership than ever before.

In brief review, some of the 1946 activities were as follows:

Advertising. Under a committee of 17 men, representing all phases of the bureau's activities, the program was made out for the year. First, advertising promoted better wiring which was tied in with the use of various appliances. This program was carried on throughout most of the year until October when full force of it was turned to a table model radio campaign, the first selling campaign since the war. It involved all media, and continued for two months. It is credited by dealers with discouraging any tendency to discount distress stocks of slow moving radio sets as had been the case in many sections of the country. The final ads for the year supported the sale of those types of appliances that were available for immediate delivery during the Christmas season.

Training. The bureau sponsored several training programs for its various divisions. First, was a selling clinic which, with other civic agencies, backed the appearance of three well-known sales training speakers, Elmer Wheeler, H. C. Danielson, and Tony Whan.

Appliance repair training was established, stressing such equipment as washers, ironers, vacuum cleaners, but excluding radio and refrigeration which had separate training programs of their own.

A sales training program also was instigated under a committee with Paul A. DuPont as chairman. Dan Turner, visual education director for the San Diego Gas and Electric Co., was the instructor. A combination of the Edison Electrical Institute, NEWA, and other sales training materials was used in a course that was launched Sept. 16 with two capacity classes. Five of the nearly 100 persons who had completed the course testified to the value of it at the annual fall conference.

Radio training was resumed with the vocational school of the city, under a committee headed by Ivan Lauritzen.

Home planners institute. A continuation of the home planners institute was carried on during the year beginning with a winter's series five nights a week in five separate locations.

Electronics. The electronics division under Grayson Lovell held several successful meetings throughout the year. At its Aug. 21 meeting, the first radio trade certificates were awarded to men who had completed the bureau's advanced training course.

Commercial refrigeration. A division for commercial refrigeration organizations was formed in cooperation with the already established Commercial Refrigeration Assn. At both the spring and the fall conference, the subject of frozen foods and refrigeration was prominently featured.

Radio interference. The committee, under Harry Callaway, made favorable progress in a continuous program to relieve Mexican station interference with local radio programs. It also coordinated with the efforts of the city interference inspector, Evan

Shaffer, in removing causes of local interference.

Electrical contractors. The division for electrical contractors, under J. F. Zweiner, had a meeting March 26 at which A. H. Gudie, Biddle Trade Bureau, spoke on the *Wiring Materials Outlook.* When the bureau was authorized to certify wiring under the National Adequate Wiring Bureau program, a meeting of electrical contractors was held for contractors from the entire territory, Sept. 5. Utility personnel and facilities were made available for the use of the bureau in this permanent program to encourage better wiring.

Conferences. Two conferences were held during the year. The Spring Conference and Frozen Foods Clinic was held May 27. The Frozen Foods Clinic set a pattern which was later followed elsewhere in the country. A fall meeting was held December 2, and approximately 500 bureau members and visiting manufacturers attended. Both these conferences have been reported in detail in previous issues of ELECTRICAL WEST.

Sales campaigns. For the first time enough merchandise was available to justify a selling program. It was decided in September to break with a table model radio campaign urging the purchase of extra table model radios for every room in the house, and to satisfy the wants of other members of the family.

Reports. The board of directors decided to resume the prewar custom of confidential sales reports from all dealers to be used in a consolidated form for the benefit of the industry as a whole. This goes into effect in January.

Upon his return from the annual meeting of the International Association of Electrical Leagues in New York, having visited some 20 factories in Chicago, New York, Philadelphia and other cities, the secretary-manager was asked to address a capacity turnout of members to get his report on the outlook for merchandise as he had observed it.

1947 plans. Disappointed, in that it could not hold its usual Fall Exposition, because the building in Balboa Park had not been released by the Navy in time, the bureau hopes to stage a Spring Fair May 6, if the Navy releases the building in time. A fall show will then be set for November to reestablish the schedule of two shows a year.

Advertising and promotion plans call for a greater volume of bureau advertising for the year, and bulletins and informational material will be released to members regularly. Radio logs, so popular in the past, will again be published for distribution to the public. A new emblem for dealers stores is being worked upon.

Ruth Butler receives dealer sales course certificate from Vere Halliday, instructor for IEA-sponsored training. Miss Butler sells for Butler Electric, Ogden

Sales training will be carried on indefinitely with classes held in county communities, as well as in the Electric Bldg. location. Training of radio technicians will be continued, with emphasis on the fundamentals as well as advanced practice. Appliance repair courses will be made available as before.

The various divisions—electronics, contractors, commercial refrigeration—will be very active, with meetings as frequent as advisable. Conferences will be held again in spring and fall. Perhaps the first big celebration will be for Edison's Centennial on February 11.

It looks as though there will be a very busy year ahead. — *J. Clark Chamberlain, secretary-manager.*

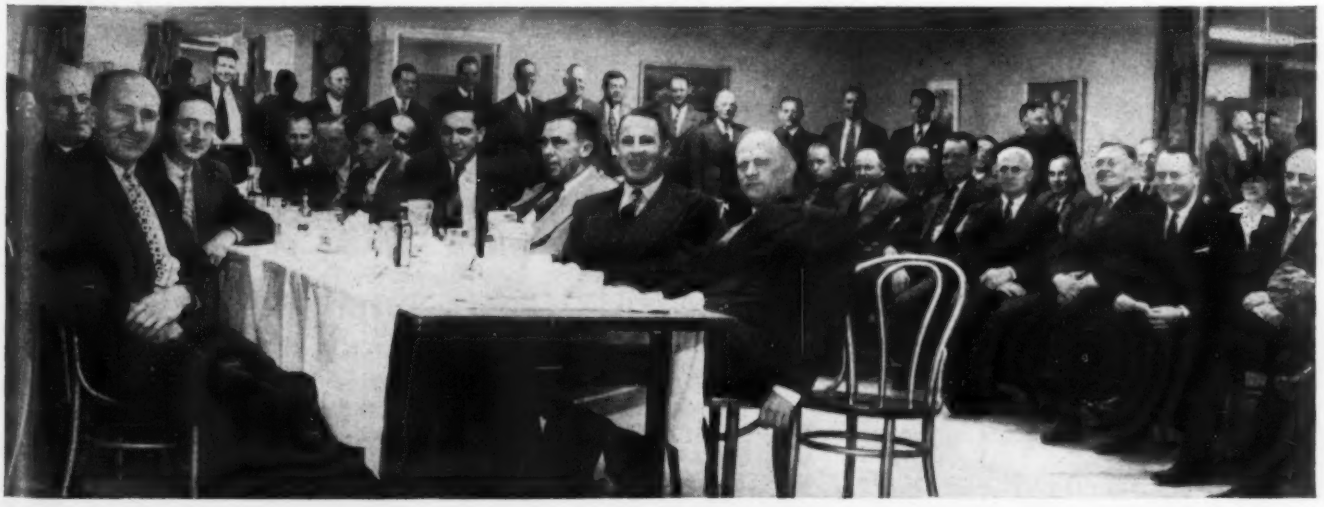
Intermountain Electrical Assn.

Expansion has been the program of the Intermountain Electrical Assn. during the past year. Having begun the year under its new title, with a central organization in Salt Lake City and a chapter in Ogden, the past year saw the formation of two new chapters in Provo and Richfield, as well as the development of a retail board. The latter directs the activities in the retailing of electrical appliances and will plan and conduct the cooperative campaigns contemplated when merchandise becomes available in sufficient quantity.

The past year's activities began auspiciously with a lighting conference in April, held jointly with and the day before the annual meeting of the Utah Chapter of the International Association of Electrical Inspectors. Educational monthly meetings were held in each chapter, as well as board meetings of the directorates of each group to handle local problems as they arose.

In June the manager, Elias Strong, resigned to accept another position and Arthur Reynolds was selected as the new manager. The association conducted the industry-wide picnic last summer and started again a news bulletin to members, called the *IEA Dispatch.*

All branches were represented in the formation of Utah Chapter, Intermountain Electrical Assn., at Provo, Utah



Plans are under way to carry on the National Adequate Wiring Bureau program of wiring promotion and certification, the sponsorship of lighting, wiring and appliance promotions, and continuation of the very successful sales training program which was carried on last year to train new salespeople for dealers in Salt Lake City and Ogden.

Northwest Appliance Retailers Assn.

Portland is peculiar in that, with two private power companies competing and with side pressure from Bonneville, it has been virtually impossible to organize and operate any kind of a promotional league. Wholesalers and distributors too have been cautious about such an over-all organization, although recognizing the need for one.

It was the need for some kind of organization that brought forth one from the dealers themselves. It is the Northwest Appliance Retailers Assn., of which R. C. Brummer is managing director. Arnold Kuhnhausen, a pioneer electrical dealer, is its president; Harold P. Kelley, an energetic young dealer, is vice-president, and Elmer N. Calef, treasurer.

Membership is open only to dealers. The others are welcome but have no official position, pay no dues and are not asked for any financial support. They are looked upon as friends and helpers when called upon. When it comes time to stage promotional campaigns it will be determined whether the financing of such programs will enlist assistance from the manufacturers, wholesalers, distributors and utilities. No affiliation exists with any other association, national or otherwise.

The problems facing the dealers right now are mostly those concerning ethics and a possibility that, with a heavy flood of merchandise and so many new firms entering this field, there may be a general breakdown of trade practices. Therefore considerable emphasis is placed on trade practices by the president, Arnold Kuhnhausen, who has led this sort of crusade for years.

Managing Director Brummer's philosophy is that rather than have lots of rules, regulations, codes, etc. and also by-laws, most of the things complained about can be corrected by a personal effort and attention, persuasion rather than pressure.

At present the organization is chiefly in Portland, but requests have come in for organization work in several other towns, and units are in formation at Longview, Vancouver, Wash., and Eugene, Ore. The idea is to keep it within the trading area of which Portland is the center of distribution. The organization has its social side and has golf tournaments, picnics, etc. and programs with educational topics.

Activities in 1946, beyond organizational efforts, declares Brummer, were aimed at bringing about better acquaintanceships among appliance retailers, better understandings between them, large and small, factual discussion of hitherto ticklish subjects, developing a willingness and readiness to talk over amicably pertinent subjects with other branches of the industry, such as the utilities, manufacturers, wholesalers and others. Familiarization with the current directives issued by federal agencies was brought about and close watch kept on the affect of these on trends in retailing.

Besides the regular board and committee meetings, at all times represented by members from diversified retailing outlets, four large group general meetings were held. At each speakers offered subjects that were timely and educational. On Jan. 10 of this year a large general meeting for all retailers, utility representatives and officers of other retail trade associations was held to hear James B. Channing, executive director, Pacific Northwest Hardware and Implement Assn. of Spokane, tell what the tax-free cooperatives were doing to the small business man.

Similar pursuits, according to Brummer, will continue during 1947, with studies made on the problems surrounding used merchandise.

Rocky Mountain Electrical League

Meetings tentatively scheduled so far include a Mid-Winter Conference in Denver on Feb. 20 and 21, a joint meeting of our Engineering and Accounting divisions in Rapid City, S. D., on April 11 and 12, and our Annual Fall Convention in Casper, Wyo., on Sept. 4, 5 and 6.

The following is a list of activities that are now under way or considered for later on in the year, providing conditions justify them:

1. Continuation of our Basic Sales Training Courses as prepared jointly by the NEWA and the Edison Electric Institute, the next one to start about Feb. 17.

2. Continuation of the Westinghouse Lighting Course in all the major cities in our territory. Those presently scheduled for this course include Cheyenne, Wyoming; Rapid City, S. D.; Albuquerque, N. M.; Pueblo, Trinidad, Greeley and Denver, Colo.

3. Promotion of an ordinance in our major cities prohibiting the use of substandard electrical appliances and equipment. Such an ordinance is now in the hands of the city attorney of Denver and we hope it will be presented to the city council in the very near future.

4. Increased promotion of our Adequate Wiring Program throughout our entire territory.

5. Participation in the Go-All-Electric Program developed by the NEMA. This will include work by our rural electric committee, which we believe will encourage active use in our rural territory now being approached by L.P.G. competition.

6. Tentative plans for an Electrical Exposition to be held this fall in Denver, depending on the availability of electrical appliances at that time.

7. Reactivated Christmas lighting contests throughout our region in cooperation with various local newspapers.

This is just a bird's-eye view of a few of our major activities but may give you some idea of what we propose to do this coming year.—*Ralph B. Hubbard, Manager.*

Inland Empire Electrical Dealers Assn.

Many plans are now in the formulative stages for cooperating with all classes of electrical equipment dealers in the Inland Empire. To date we have three chapters of the Inland Empire Electrical Dealers Assn. activated, the other two chapters to be activated this month. The three activated are the Spokane, the Lewiston and the Palouse chapters.

These three chapters are going along in good shape with standing and special committees appointed for coordinating Washington Water Power Co. and dealer sales activities. The other two undoubtedly will follow the lead of the three activated chapters.

Included in our plans for dealer cooperation are a sales training program, home service assistance to all dealers including cooking and other demonstration classes, service and repair training, different types of sales promotional programs, including all-electrical services in the home. Adequate wiring, which has already been started, will carry on for the first six months of the year as a direct advertising program. Electrical contractors and electrical dealers will supplement this advertising with their own respective firm advertising.

Other association activities, in which we are cooperating, are designed to assist small dealers to operate profitable, ethical businesses. These include

Officers of industry groups, dealers, utilities, jobbers, contractors, at Victoria electrical league launching. A. Kent, Alderman E. Williams, W. C. Mainwaring, T. C. Clarke, A. E. Gauer, Dr. Carruthers PUC, R. Beaumont, W. Lewis

a standardized accounting procedure from which percentages of operating costs in relation to gross income will be compiled and average percentages sent to all members of the association for comparison with their own businesses. There will also be standardized conditional sales contracts, financing contracts and centralized trade-in agencies.

We are also publishing a dealer news-bulletin to be known as the *Inland Empire Dealer News*. Included in this bulletin will be pertinent sales and program information and a monthly sales summary of all electrical equipment sold by electrical equipment dealers in our territory. We plan to publish in the near future a dealer brochure outlining the company's cooperative program.—*F. A. Tool, Supervisor, Dealer Sales Development.*

Electrical Service League of B C.

In reviewing the past year's activities of the Electrical League of British Columbia, one outstanding achievement was the extending of the league services to Vancouver Island. It was a step contemplated for many years and will be of assistance in welding together the various divisions of the industry here.

Formal presentation was made at a dinner in Victoria, Nov. 6, where some 130 attended and were told of the league's progress and activities on the mainland. Since then the league has assisted in the formation of a strong electrical contracting group. It is intended that a home appliance council will be set up too, and steps taken to form an electrical club. It is hoped that the B. C. Hydro Commission, which operates many properties on the Island, will become members and participants in the league's work.

Affiliated with the league is the Vancouver Electrical Assn., an organization of electrical contractors. Membership has increased to over 100 members. This association holds regular meetings at which educational programs are presented. It has been very cooperative in the promotion of the Red Seal and adequate wiring plans and in the fostering of the 22-kva. residential service in all houses costing $2,500 and over. This service consists of three No. 2 wires in the service cable with a 100-amp. main line switch.

The association's recommended pricing service has been one of the most valuable services performed. The Wartime Prices and Trades Board has used it as a guide for price control. Cessation of merchandising by the B. C. Electric Co. has caused a financial problem, however. For years the association dispatched and its members installed all wiring necessary for the installation of major appliances sold by the utility. The utility paid the association for it. The association deducted from these payments the member's dues and for taking care of the office routine, and paid the balance to the contractor making the installation. This aided the association to conduct its affairs.

Efforts may be begun in 1947 to form an inspectors association at the suggestion of inspectors of the province.

Prior to the war, a home appliance council of dealer and distributor members made substantial progress and the formation of such a council again is being undertaken. Through this council it is planned to conduct campaigns if merchandise is available and to do whatever may be helpful to the retail division of the industry.

The league has cooperated with the power company in presenting educational motion pictures to public groups and schools. Car card space has been given the league by the power and street railway company for advertising adequate wiring and offering prospective home builders the service of checking their plans and making layouts. The league has also prepared plans for commercial and industrial lighting for 400 stores, offices, plants, schools and farms.

The amount of business stimulated through a well-designed lighting and wiring plan not only increases the value of the wiring installations and fixtures but when installed is a prominent advertisement for improved lighting to every other merchant in the vicinity. In order to further stimulate inquiries for information it is proposed that a lighting school be held.

Through cooperation of the power company the services of three home lighting specialists have been available to draw up wiring plans for the league. There were 554 such plans drawn, calling for adequate wiring and many providing for new light sources and built-in lighting.

Despite the emphasis on low-cost housing for veterans, through the consistent efforts of the league for years and active field work, there were 865 certificates given for complete Red Seal wiring, and 683 more were Red Seal with the exception of the range circuit, many of which will be converted as more cable and ranges are available. The planning department turned out 554 Red Seal plans, each with from 15 to 20 additional outlets. This is a fine record when it is considered that the total houses wired in 1946 totaled only 3,890, of which 810 were constructed by the government in a housing project and 626 were built at costs of less than 2,500. Fifteen apartment buildings with a total of 210 suites were issued Red Seal certificates. Of 33 duplexes, 11 were Red Seal.

While speaking of shortages, it is interesting that from records it is known that 1,600 new ranges were installed in the metropolitan area of Vancouver in 1946, a greater number than in any one year previously. There were 1,000 electric storage water heaters installed, considerably more than the total sold since water heaters were first put on the market.—*R. Hall, secretary-manager.*

"Fustest With

Universal follows General springs first complete '47

FIRST to throw its hat in the ring in a challenge for foremost place in the electrical appliance contest for business was Universal—Landers, Frary & Clark, that is, and it began the New Year right with its first of three distributor sales conferences at San Francisco's Mark Hopkins, Jan. 8-9. What it showed the ten Western distributors' organizations, a complete line of newly designed 1947 models, will make it hard to catch up with. There was style, there were new features and gadgets and there will be a tremendous advertising drive to soften the market for these new home appliances. Distributors were given the preview and told to take the line to their dealers immediately. Barring strikes the shining new merchandise should begin to flow soon.

Top executives brought the show to the San Francisco conference. They brought the actual merchandise, too, not mere pictures, even some that are still under wraps for later unveiling. Bret C. Neece, vice-president, and general sales manager: H. M. Parsons, vice-president in charge of major appliances; W. J. Russell, vice-president of engineering; Harry Pryor, assistant sales manager; E. L. Farquaharson, laundry sales manager; Lee Moss, home cleaning sales manager; A. S. Bross, electric blanket manager; E. J. Van Buskirk, vice-president of small appliances; W. J. Cashman, director of promotion and publicity; Stanley Fisher, were the factory group.

Attending were representatives and owners of these Western distributors of major appliances, for it was a

Western distributors and factory executives after the product sessions. Top: Roy Denny, Bret Neece, Universal vice-president, N. R. Thomas, Los Angeles, B. H. Richards and James McMann. Next to top: a Spokane group, Lou Weiss, Lee Moss of the factory group, Dave Cohn, Prudential Distributing Co., Bill Harder, Harry Parsons, Universal, and Jim Fleming, Ellis Paint Co., Butte. Next to bottom: a San Francisco Thompson Holmes crowd, with Universal's H. M. Parson at center, and including Mel Pettis, A. D'Ettienne. Los Angeleno Ed Potter got in the background. Bottom: North Coast Electric of Seattle and Portland: Harry Byrne, Ray Noble, Harry Bryne Jr., Fred Knight, Lee Moss and Jim Spier

the Mostest"

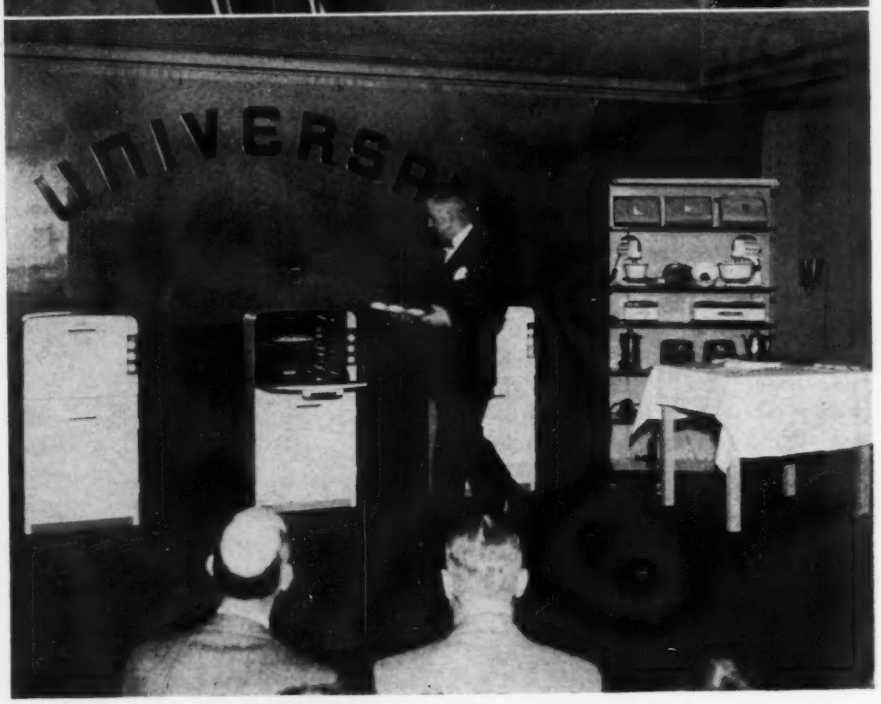
Sherman's formula and appliance line in West

major appliance showing primarily: North Coast Electric Co., Seattle and Portland; Prudential Distributing Co., Spokane; Ellis Paint Co., Butte; Parker Co., Denver; Strevell Patterson Co., Salt Lake City; Ilfeld Co., Albuquerque; Al Jennings Co., Tucson; Arizona Hardware & Supply Co., Phoenix; Nelson R. Thomas Co., Los Angeles and Thompson Holmes Co., San Francisco.

The last named, Thompson Holmes, staged a welcome for the conference by cooperation with local dealers, who made window displays of Universal appliances and ran big ads in San Francisco papers.

Sprung for the first time were some brand new appliances. First, Russell, who is responsible for the streamlining and redesigning of most of the line, unveiled an eye-appealing and clever little bantam range, like a large roaster turned sideways, with hotplates that turned over make a broiler. It ought to prove a popular apartment and small house big seller. New also is an electric blanket, a two-speed washer (and an automatic promised later). The new ranges are exceptionally attractive and crowded with sales features. There will be a full line of water heaters. The cleaners, tank and conventional types, have a whole housecleaning kit as well as new gadgets, the electric iron has a headlight, the toaster permits peeking without interfering with the current, the coffeemaker provides dialing for strong, medium or mild.

Cashman closed the meeting with a sweep of the advertising program.



Pride of the new 1947 line is the new deluxe Speedliner electric range, which Harry Parsons of Universal is showing to Roy Denny of Nelson R. Thomas Co., southern California distributor, in the upper picture at right. There are eight models in the range line which Parsons, vice-president of major appliances, presented. Center: Vice-president Bret C. Neece of Landers, Frary & Clark, makers of Universal appliances, tells the distributors of the West at the San Francisco meeting that Universal is first with a completely redesigned new line of 1947 appliances. Bottom: Vice-president in charge of engineering, W. J. Russell, demonstrated the entirely new bantam electric range to the crowd which received it very enthusiastically

Stores with Modern Ideas

One in San Francisco the other in San Diego, embody new display techniques worthwhile

Outside of the downtown shopping zone but on a heavily traveled street, the American Home Appliance Co. (above and at left) makes the entire store front a display, spectacularly lighted at night so that passers-by on foot or in a car cannot help but see. Note the "shadowbox" stage-like front, inset from the sidewalk, with lighted panels on each side. Inside, the store is departmentalized. Shown are the refrigerator and range area and beyond the working model kitchen. Beside general lighting note trellis effect over the refrigerators, which conceal adjustable reflector spot lamps trained on merchandise itself

Turned in lines of the front windows on two sides of Cantor Bros., appliance and radio store, San Diego, are architecturally echoed in the display tables, counter, and entrance way. Birch wood, light in tone, was used even in the small appliance display shelves shown on the rear wall. It sets off the appliances. Chrome trim inside echoes the chrome post at the corner entrance overhang, made of war surplus airplane knuckle manifolds. If the eye appeal draws customers, Eddy and Lawrence Cantor will get their share of trade. As tire dealers, they branched out in appliances in a new store, placing Henry Bruneau in charge of the appliance store. Turned-in or slanted windows on two sides make the entire store a display, reduce window reflection from street

ELECTRICAL WEST Sales Guide

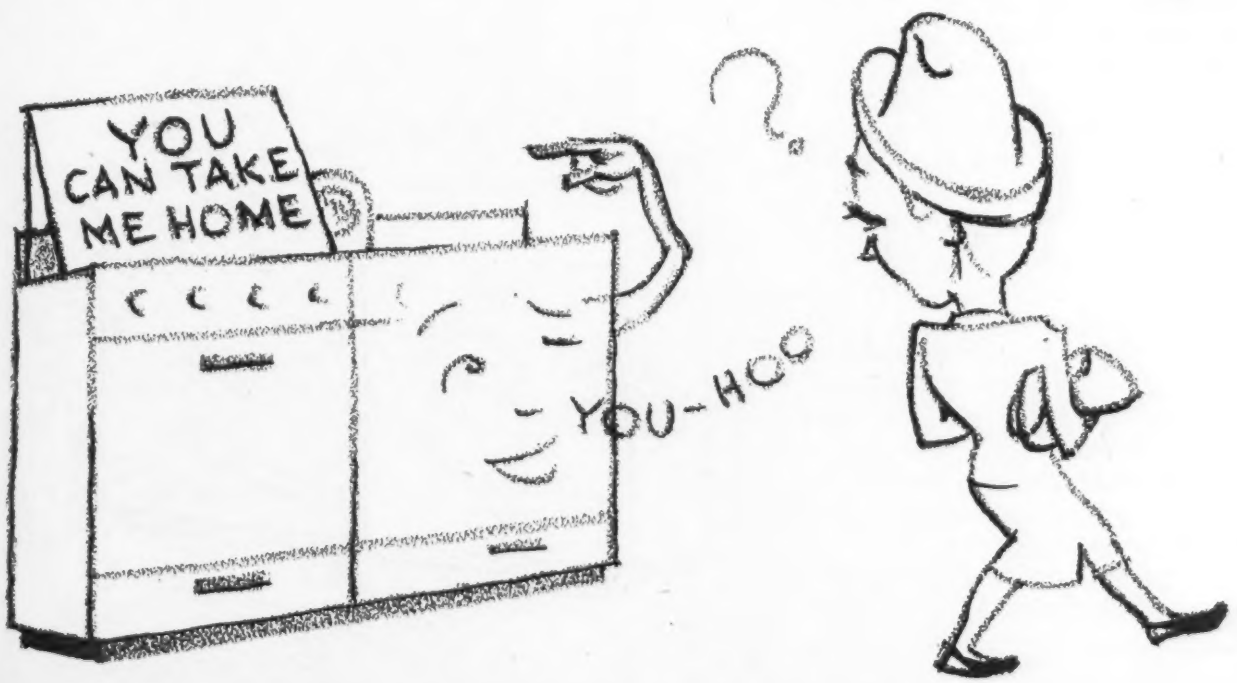
FOR THE ELECTRICAL MERCHANT OF THE WEST © February, 1947

The Day Will Come—

AT the present rate of increase in production and with the big increase in facilities to produce, **it won't be long now** until ranges reach that point at which you may not have someone waiting to take it away from you before each range is uncrated.

How long has it been since you really had to **sell** an electric range? Long enough to have grown a bit rusty on the way it's done? Wouldn't it be wise to brush up on that old basic selling story, the one that fits **any make** of good range, regardless of the gadgets and features?

Fuel type ranges have strained every ingenuity to try to imitate the features and gadgets of an electric range. They've borrowed electric lights, timers, convenience outlets, insulation and styling. So what have you got to sell to outsell them, sometimes over a price and installation cost differential? Surely it is that basic difference, that superior way of cooking, the better means, the Matchless way—(reviewed next page).



Think one word, MATCH.

One thing the long rest from selling has done: It has cured the staleness. Not that the good sales story ever got stale to a new prospect. She had never heard it before. But often the salesman himself got a bit stale on his presentation, tired of it.

No excuse for that now. To get back into selling is brand new again. It has been a long, long time. To anyone with a zest for selling it ought to be fun again. Nothing gives a salesman such satisfaction as to feel that his selling is getting results. When he can feel the prospect "give" a little to his powers of persuasion he knows he is making headway.

Overcoming the claims of competition by presenting superior qualities or features brings its reward too. The competition against the electric range makes many claims. The new designs of competing ranges have been "hopped up" to look like, act like and almost equal the performance of electric ranges. But you still have the edge with electric. Whatever the other type does the electric can do better.

If the others claim a clean range, the electric is cleaner; if cool, the electric is cooler; if fast, the electric is just as fast; if virtue is made of cooking at low temperatures, the electric can cook at low temperatures with greater safety and better control; if it's automatic, the electric is in its own home grounds on automatic control, handles it for industry and fine processing and chances are the competition has to use electric control too. If it is long-lasting, the electric should last longer for its controlled temperature is easier on oven linings, metals, etc. In appearance and appointments the electric range is what they imitate. In safety there is no matching it for even turned on it can do no harm, create no hazard. Its cost of operation is comparable with even the cheapest of fuels.

The superior sales appeals of electric cookery are listed in the center of these pages. There is no match for electric.

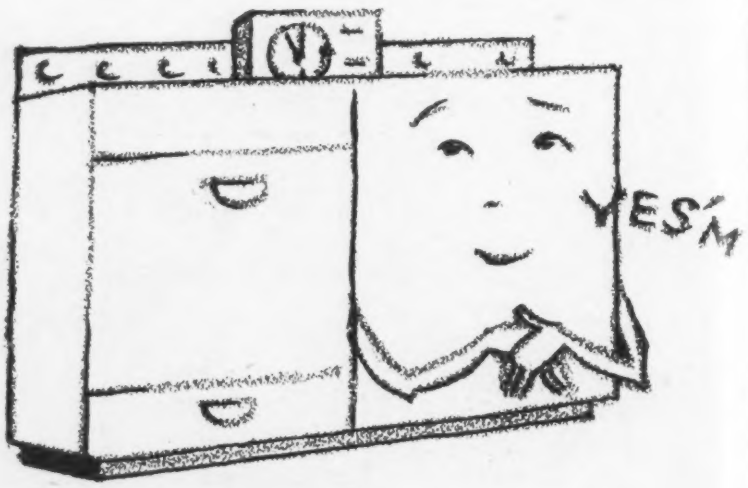
MODERN—All others imitate its modern styling and features but cannot its clean, odorless, trouble-free way of cooking; it needs no MATCHES or pilots to light it.

ACCURATE—Cooks with identical results, time after time. Heat is under absolute control. ATTRACTIVE, too, for it makes any kitchen look modern, smart, inviting, clean, cool.

TIME-RELEASING—The automatic timer starts, watches and stops cooking the meal for you. Gives you more time for other things. Its cleanliness saves you cleaning time and work.

CLEAN—Clean pots and pans, clean kitchen and walls, clean air, a range easy to keep clean and shining itself, clean drapery, silver stays clean, untarnished by fumes.

HEALTHFUL—Produces better tasting, better digesting, better looking food. Preserves delicate vitamins, retains minerals, flavor and moisture in foods. Healthful, clean air.



LESS, it's the key to sales

LABOR-SAVING—Because it is clean it saves housework. Oven meals save preparation time. Accuracy saves pot watching. LONGER LASTING too, its oven is slower to rust.

ECONOMICAL—Its EFFICIENT heat is not wasted, goes right into the pot and food. It cooks with less shrinkage; makes cheaper cuts tender. Modern rates make its cost low.

SPEEDY—As fast as any fuel with new fast units; stored heat keeps it coasting or warm. SUMMER cooking is cool because it wastes no heat to the kitchen atmosphere.

SAFE—With complete peace of mind you can leave it to cook or allow children to operate. If small children turn it on it can do no harm. Healthier for plants or pets.

The placing of an electric range in the arrangement of a kitchen is independent of piping, chimney or vents. It can be safely set in close against the wall and to cabinets or in the middle of the room for modern kitchen planning.

So much for the sales points to use in your selling. What other preparation should a salesman make before the time of real hard selling arrives? Here are some suggestions just as reminders. "Old stuff" perhaps to the old-timers, but always worth remembering.

Learn the product. It is worth while to study every detail of the range or ranges you sell. If anyone asks any question about anything, this will equip you with an answer.

Learn to cook. The best salesmen in the past did it. Think of it this way: You wouldn't be likely to buy a car from a man who couldn't drive, would you? Get to do it smoothly, like an old hand. It gives you self assurance and showmanship. You can really "talk the language" of electric cooking if you have done it yourself.

Demonstrations. They were a big help in the days when selling was tough. They should be a big help again. Even arrange it so your customer can try her hand at it, get "the feel of the wheel" so to speak, a sense of ownership. Remember too that 87% of our impressions come from seeing.

Think like a customer. It helps you translate the good points of your range into attributes that the customer wants. For example: Don't just say, "This range has porcelain enamel." It may not create the picture you want her to have in just those words. Turn it into her language. "It will always be easy to keep the range clean simply by wiping it with a damp cloth, because you see it is finished in this clean, white, hard-surfaced porcelain." That means something to her.

Closing. Well, welll Imagine having to **ask** for the order again. But it is coming. It always was a good rule to put it in the form of a question that calls for a choice of one or another positive action, such as, "Would Thursday be a good day to make delivery?" or "Let's order the installation right away and save time, shall we?"

Things that Always Help in Selling

Things have been un-normal for so long that many of the practices helpful to selling in the past may well be forgotten. While selling is always dressed up in new garb its fundamentals are as old as the hills and just as solid. With a new dress-up they can and should be used again when selling really begins.

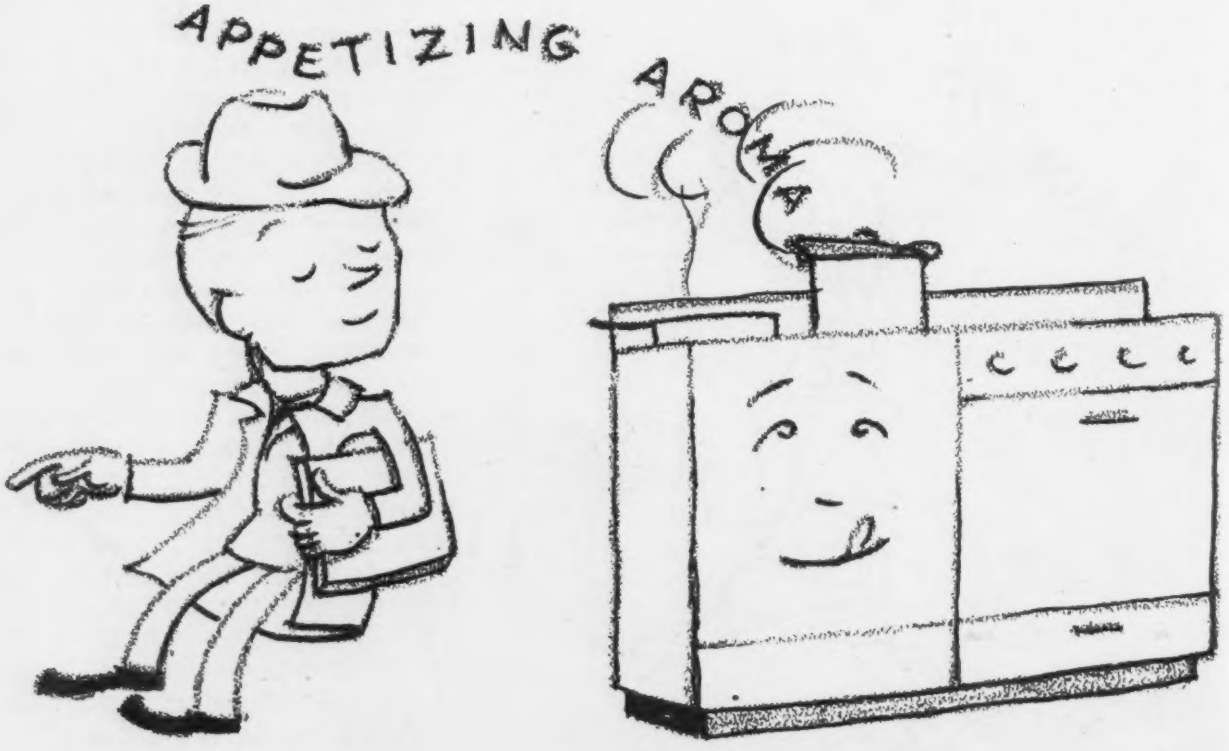
The main idea is to make it smooth and easy for the customer to buy. This goes all the way from providing a display that can be seen, floor models that can be felt and tried, sales aids that help the customer see and appreciate the advantages of buying and then, when the sale is made, efficient and clean delivery and installation so that the user gets satisfaction out of it from the start. So here is a check list—

Display—Are display samples placed where traffic is heavy? Is the window display one that brings out the range's best qualities? Do banners or window or floor cards tell what's good about the range?

Demonstrations—Are you set up with working ranges to put on demonstrations? Remember that sense of smell is one of your best salemen—an appetizing aroma certainly speaks louder than words. Do you have an electric kitchen in which to take customers away from floor interruptions to see cooking actually done?

Deliveries—Are you set up to uncrate, inspect, clean up and deliver the range with pride? Why not put some showmanship into delivering a range so that neighbors will have their interest awakened and become prospects?

Wiring—It is wise to have arrangements made for wiring and a clear understanding on all points. Tie up with a good contractor to take care of this important part of the job for you. Don't complain about wiring. It does not help you put over a sale if you make it seem terrible. Sell up the long-time value of having it done. Keep always on the positive side.



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ELECTRICAL WEST Sales Guide

NEWS LETTER FOR THE ELECTRICAL MERCHANT OF THE WEST

February
1947

©

Big market

Certainly was a big market, the winter market week, Feb. 3-8 at Western Merchandise Mart, San Francisco—big in attendance, in exhibits and in activity. Appliances certainly drew the biggest crowds, too. The 4th floor was milling with dealers the entire week. The Appliance Dinner, Wednesday night, overflowed the huge dining room into halls, kitchen and Green room.

Healthy sign

J. W. Stigall, Launderall's sales manager, declared the coming buyer's market healthy. "Underproduction menaces the financial structure of business because it lowers its income." "A sellers' market makes for inflationary pricing and has a tendency to make us somewhat indifferent and lazy."

Welcome competitic

"Competition in manufacture and merchandising produces more and offers it to a greater number of people at lower prices." Stigall said it would be good for the automatic washer to have a lot of good companies making and selling them.

Keep standards high

Carl Sorby, evangelist of the gas range industry, vice-president of Roper, was eloquent in advocacy of continued high standards in merchandise, in salesmanship and ethics because whatever the industry does affects the future attitude of the younger people who have entered the business. He did a fine job of reawakening enthusiasm and the desire to get to selling.

Automatic show off

Automatic washers were the prima donnas of the market. Nearly all the long heralded makes were on exhibit and being demonstrated. The new Apex with the swaying tub, the ABC-O-matic with its built-in wringers, the Blackstone, Westinghouse Laundromat, Thor's Automagic, and F. L. Jacobs' Launderall, and the pioneer Bendix.

Laundry companion

Bendix showed for the first time its laundry companion pieces, a new under-the-roll-shoe type ironer and a dryer. Sampling with the ironer will begin within 30 days and be complete in 90 days, Neal Schuman, Bendix Western regional sales manager promised. The dryer will begin coming about June. Both are top rank jobs in a single automatic model with national price of $199.50 for ironer, the same for the 4-kw, 220-v. dryer. A gas dryer will sell at $219.50.

Other new things shown for the first time: Crosley television receiver with movable screen which disappeared in the handsome cabinet when not in use. Westinghouse's slick new electric comforters. Cory new fully automatic coffeemaker. Thor's Automagic dish and clothes washer in a new sink unit. Gibson range with the "Upsadaisy" unit in the cooker. The six burner, two oven Thermador range. The Young Washer and the Empire ironer and new Federal Radio sets at Schuyler-Wilson space, also the Flavor-Seal electric milk pasteurizer for small farms. The new Collman 58 electric shaver. The Century Glide-O-Matic iron shown by Meier & Murphy. The Spitfire electric lawn mower shown by Gordon Wilkins.

New

First time seen in a mart showing was a line of farm equipment, handled by General Electric Supply. Center piece was the G-E farm and home welder, a 25-amp., 230-v. portable kit. Also shown were a poultry scalder and picker made by Atlantic Engineering Corp.; both a milker and a separator, made by American Separator Co.; Gem-Dandy butter churn; Stockwatcher electric fence made by Lionel Corp. and Richards electric fence, made in Payette, Idaho; a Lowell Spray outfit.

Farm appliances

High up executives attending the mart, besides speakers Stigall and Sorby, included Ray Turnbull, president of Hotpoint; H. W. Altorfer, one of the Altorfer Bros. Co. (ABC); A. C. Scott, of Apex, a displaced Westerner now sales manager; Ralph Sorenson, manager small appliance dept., Westinghouse; Larry Coen, sales manager, American Central Kitchens.

Big names

First time anywhere was shown Nesco's new aluminum portable electric (1250-watt) heater, designed by Cliff Russell, former sales manager, and Harry Mooney, former factory engineer of Wesix. It weighs only 3½ lb., is water and moisture proof, and will retail at less than $15. Russell & Co. distribute National Enameling & Stamping Co. heaters, roasters and Nesco-chef apartment ranges. Deliveries of the heater will begin this summer.

Premiere showing

Cagey about making promises after last year's disappointments, nevertheless prospects for merchandise are much better, all admitted. Buying was slow in housewares because dealers said they are loaded now. Buying at the gift shows was more discriminating.

Better prospect

Electric range production at Crosley, said Nick Dinkle, is under full steam this month. Console radio production is slowed by cabinet wood. Kitchen cabinets are in need or more steel.

Ranges start

Scouting for steel too, was Ray Turnbull, ex-westerner Hotpoint president. Everybody is expediting these days.

Steel

Apex automatic washers will be sampled in the West come September, said Al Scott. Meanwhile production of standard washers and vacuum cleaners is up to prewar peaks. Also shown, but eclipsed by the automatic, was Apex's new Fold-a-matic ironer which folds away neatly in a kitchen cabinet unit.

Disappears

Ben Sanderson and Alex Kuehlthau of Electromaster explained that their new factory had just been moved into and would soon be in full production. Launderall deliveries, said distributor McCormack, are coming in regularly now.

Deliveries

Westinghouse comforters are feeling out the market in a few key cities, San Francisco and Oakland being the only ones west of the Mississippi. Sorenson said there should be enough by fall for a good winter business in them. Westinghouse also showed two new toasters and a mixer and its iron, down to 3 lb.

Sleep testing

American Central will add to its slick new cabinet line an automatic dishwasher and disposal and later a built-in home freezer, said Larry Coen. Fractional hp. motors are setting the pace.

In the kitchen

K. E. Campbell, Toastmaster representative, up from Los Angeles, said the asked-for toasters are coming in better quantities and will continue to do so before the new waffle iron is brought out.

Toaster tidings

U. S. Grant of Los Angeles announced his appointment as distributor for Norge, through his export-import division, for the state of Baja California, Mexico, including Tijuana, Mexicali.

South of border

Proctor started its spring series of distributor meetings in San Francisco, Feb. 6, to reiterate its policies, announce its million dollar advertising campaign, announce a new super Never-lift iron and a completely new roaster in June. Joseph Tiers, assistant general sales manager accompanied Charlie Culbert, Western regional manager, on the tour.

Spring tour

The Gamble-Skogmo chain, including Gamble, Western Auto and Macleod's, held a huge sales convention at Minneapolis civic auditorium Jan. 27-30, attended by 3200 dealers and store managers and heard the goals, programs and policies from the head men. Saw displays of 200 manufacturers who supply them, among them General Electric on small appliances. Its own brand, Coronado, will add an automatic washer, made by Bean Mfg. Co. of Webster City, Iowa, to its refrigerator and range line. Were urged to get into outside selling in the face of buying resistance.

Expanding program

Lamp prices are downward. Penetray Corp. which introduced the reflector-type infrared lamp on a popular scale, dropped the price from $3.50 to $2.90, retail. Westinghouse has likewise announced a drop in sunlamp price from $15 to $9.95 list.

Lamp drop

The National Assn. of Refrigeration Contractors and the United Assn. of Journeymen and Apprentices of the Plumbing and Pipe-fitting Industry have entered a national agreement of mutual recognition. Lee Shirar, of Shirar-Young, San Francisco is chairman of the labor relations committee of NARC.

National agreement

Handyhot portable electric washer has reappeared with a stainless steel tub and new styling. Its capacity is 3 lb. of dry clothes. Its market, Chicago Electric Mfg. Co. suggests, is the apartment dweller, the small family, the summer cottage, and as a second or auxilliary washer for between times and for lingerie where there is a regular washer. It has a hand wringer as an auxilliary.

Small washer

Showings of the deluxe line of Freed-Eisemann radio phonograph combinations were made last month by C. G. Hamilton Co. at the Western Merchandise Mart. Distribution has been more or less limited to a few large accounts in each major trading area. Four models are available now, each FM equipped.

Deluxe sets

Those who sell wiring devices will be glad to hear that January production exceeded all monthly records as a freer flow of materials and components speeded production. Ought to speed many appliances which have been held up for some such parts as switches, etc.

Counter items

Interstate Engineering Corp. is now the name of what used to be Interstate Aircraft & Engineering, at 2250 E. Imperial Highway, El Segundo, Calif., maker of a Compact vacuum cleaner.

Shorten

Remember the much-referred-to lists of authorized repair parts and service stations for appliances which Electrical West printed in 1938, 1941 and 1944? A revised and up-to-date new directory of repair parts and service stations, with many new appliances added, will be part of the April issue. That's the issue with the big directory of Western representatives of all electrical lines. Its one to have and keep; worth more than the year's subscription price alone.

Parts directory in April

The February issue, of which this News-Letter is a part, is well worth keeping by every dealer and distributor too. It has the statistics of the market applying to the West. The sound way to run a business is to watch its figures. They are the like the instrument panel is to a pilot.

Worth study

Another change -- General Electric Appliances, Inc., takes over what were formerly the nine G-E Appliance Distributing Branches, one of which was in Los Angeles. Steve Maher and G. A. Lloyd gave dealers their first postwar preview of the G-E Spacemaker line of refrigerators last month, first in Los Angeles, then San Diego.

Shorten name

The battle over color television goes on before FCC in Washington. CBS sprang a portable table model, to be made by Bendix radio, to the surprise of its rivals. Even a San Franciscan, George Sleeper, Jr. claims a set that can convert black and white to color through filters.

Video color

Sears Roebuck is having Colonial Radio make it a radio that incorporates a wire recorder.

Wire

If its any consolation to electrical dealers who feel that their market for electric heaters has been hit by the utilities notices to check with them to see if they can serve the business, the Portland Gas & Coke Co. had to do the same with gas. We are still better off than England.

Restrict gas

Before long appliances may come equipped with a three-prong plug and wall outlets be equipped with receptacles to take either two- or three-prong plugs. All interested parties are working to ground portable appliances for greater safety.

Safety trend

Proctor's new pop-up toaster is equipped with a "color guard" to give the desired color of toast regardless of the dryness of the bread. Will even reheat cold toast without burning.

Color watcher

Horton has an instruction book on ironing, "Invitation to Ironing Luxury", using the photographic technique to demonstrate every step in use of its ironers. It is a home demonstration in print.

See how

APPLIANCES
and accessories

Home Precipitron (234)

Westinghouse has started production of a household Precipitron, electrostatic air cleaner said to remove 85 to 90% of all dust in the circulating air streams in homes as large as eight rooms. These units will be available in a compact cabinet model about the size of a refrigerator or built into a furnace unit by furnace manufacturers.

The cabinet model stands 52 in. high, is 27 in. wide and 34 in. deep and is made for use in conjunction with a warm air heating system or with an independent air circulating or air conditioning system. High-voltage d-c current for the unit is produced from standard house current by the "energizer", which consists of electronic tubes, transformer and capacitor.

Dust-collecting plates are cleaned by turning a handle, releasing five sprays of water which automatically wash away the dirt. The flushing operation lasts about three minutes; is required about as often as a refrigerator is defrosted.

Installation of the cabinet model requires a water supply and drainage outlet, an electrical connection to the standard a-c supply and air duct work to fit the unit into the heating or ventilating system.

Refrigeration Alarm (235)

Tork has a new deep-freeze refrigeration alarm which will ring every eight seconds for as long as 20 hours if the temperature rises above safe limits or if a power failure occurs. The alarm is a spring-driven stand-by watch, installed at the freezer or at any convenient remote point. It is audible for a 50-ft. radius, requires no regular attention and has a reserve indicator showing the number of hours reserve it is wound for; is housed in an aluminum case with lucite cover, dust-sealed.

Automatic Washer (236)

An automatic washing machine incorporating the agitator principle has been announced by Hotpoint. The user of this machine selects the time and water temperature for the washing cycle; from that point the operation, including soaking, washing and rinsing, is controlled by the electric mechanism. Water is poured into a lower well, is pumped into an upper washing tub, where clothes are soaked with the agitator in motion; the tub is then spun at high velocity to spill the water back into the lower tub.

Capacity of the washer is 9 lb. of clothes. Equipment includes over-size rubber wheels and a front plate for permanent installation, if desired. Machine dimensions are 36 in. high, 25 in. wide, 25 in. deep.

Refrigerator Line (237)

Hotpoint is showing its 1947 deluxe model 8-cu. ft. refrigerator and announces that as manufacturing schedules are met, it will have three new 8-ft. models, a 6-ft. model, a standard 10-ft. model and two home freezers, a 4-ft. and an 8-ft. model.

The new deluxe 8-ft. refrigerator is designed to occupy approximately the same floor space as the previous 6-ft. model. Its speed freezer has a capacity of almost 1 cu. ft. and contains four ice trays; an extra large storage space is provided for frozen meats; fruit and vegetable compartments are larger than on former models. An innovation is the basket sliding adjustable shelf, with a protective rail to prevent dishes from tipping when it is removed.

The 8-ft. home freezer will be large enough to store fresh vegetables and meats for an average-size family for several months, and will provide plenty of room for items such as bread, rolls, cookies, cooked foods and leftovers, the announcement said. The unit has storage space for 280 lb. of food and will "quick freeze" more than 30 lb. at a time.

Alarm Thermostat (238)

An alarm thermostat to protect frozen-food cabinets has been announced by G-E. Contacts of the thermostat should be wired in series with an indicating light, electric clock or other device, the manufacturer says. So long as the temperature is safely below the thermostat setting, the lamp glows or the clock runs; if the temperature approaches a dangerous level, the thermostat opens and the power to the light or clock is cut off. If the power supply to the compressor is cut off, the light goes out immediately, warning of trouble before the temperature begins to rise. An immediate warning is given if an alarm wire breaks or the light bulb burns out. This thermostat uses 110-volt a-c and is sealed against moisture and dust. Calibration is guaranteed within plus or minus 3F, according to the company announcement. Leads can be furnished in any length.

Indirect Bulb (239)

The 200-watt indirect Bolite bulb introduced by Sylvania provides its own diffusion and is sold with a wire adapter for use in existing table and floor lamps. The Bolite screws into the socket facing upward and employs two types of diffusion: a top frost to give upward diffusion without too much light loss; an opalescent coating on the lower part, for greater diffusion of light falling on reading or working surfaces. Shade support adapters come in three types. The illustration shows a specially designed combination floor lamp utilizing both the new bulb and a circular fluorescent tube.

Cord Switch (240)

Trilmont Products Co. is offering a double-pole, single-throw feed-through cord switch designed to operate on devices rated up to 2,500 watts a-c or d-c, 125 or 250 volts. This switch carries the Underwriters' listing of 20 amp. at 125 volts, according to the manufacturer, who claims for it ruggedness, long life and safety features. A glow lamp indicates when power is on. Housing is plastic.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

234 235 236 237 238 239 240

Name..... Company*..... Title*.....

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ELECTRICAL WEST

McGRAW-HILL COMPANY OF CALIFORNIA
68 POST ST. SAN FRANCISCO 4

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Figuring on the Future

ONE GOOD WAY to start a headache is to study sheets filled with statistics. However, we can guarantee that there are few if any headaches in the statistical tabulations in this issue of ELECTRICAL WEST. Instead even a superficial study of the figures is more likely to produce expanded chests, faster-beating hearts, and anticipatory gleams in the eyes. Because seldom if ever before in the history of the industry in this region has the outlook been more bright.

Consider such significant barometers of electrical market potential as these: A 16.7% population gain since 1940 coupled with a 10% higher average effective buying power than for other regions of the U. S. Electrical energy utilization exceeding wartime peak demands and still expanding. A $285,000,000 power facility construction budget for 1947. A 6.7% electric customer gain last year with every likelihood that the increase will be even greater in 1947. A three-year generating plant expansion of more than 2,500,000 kw.—25% of the total scheduled for the U. S. as a whole. A demand for $250,000,000 of new appliances. A housing boom that could mean $200,000,000 of wiring business. An industrial growth rate of more than two new factories a day.

Such factors as these are difficult to reconcile with predictions that 1947 may bring a minor business recession. Instead they provide the basis for real enthusiasm and optimism for the future of Western electrical business.

A Truce in the Northwest

OF more than passing interest is the news story elsewhere in this issue noting that a tripartite coalition has been effected in the Pacific Northwest for the purpose of insuring Congressional appropriations for continuation of the federal power program in that area. The private and municipal utilities have joined forces with the Bonneville Power Administration temporarily so that a unanimous front can put pressure on Congress for BPA funds. The nature of the coalition and its terms are described in the news story.

However, even more significant than the temporary truce (it may prove to be lasting) is the potential conflict which inspired it. Interior Department appropriations will come before a committee which is certain to be headed by an opponent of huge federal power expenditures. The chairman will be one of two representatives who have been bitter critics of the political activities of the BPA. Already it has been rumored that the Bonneville budgets were due for a trimming. Conservatives who have previously assailed subsidization of power and irrigation projects in the Far West with taxpayers' money are now in the saddle.

The situation was recently aptly summed up by the Seattle *Post Intelligencer* in a statement to the effect that "Our Power Chickens Have Come Home to Roost." It could be.

Whose Responsibility?

AMERICA'S Fatal Streets is the new name for the main traffic arteries in our towns and cities according to the Street and Traffic Safety Lighting Bureau. On them occur 50% of all urban traffic fatalities. Motor vehicle accidents account for 30,000 deaths and more than 1,000,000 injured people a year—a tragic toll to pay. And at night, with traffic density only one quarter as great, on America's Fatal Streets, three times as many people are killed as in the daytime.

The electrical industry knows, but the public is only partially informed of the fact that visibility is a vital element in this record of death and maiming and damage. Inadequate lighting—generally only half the recognized minimum for safety—is the big reason for this carnage. To some degree at least, this is a responsibility of the electrical industry. Our inclination would be to place some share of the burden on the industry as long as this condition exists.

Streets won't be adequately lighted until city councils and safety commissions and citizens generally appreciate and acknowledge the need. This will not happen until they are thoroughly conscious of the problem and the means for its solution. And this is a selling job for the electrical industry.

Thomas Alva Edison

"EDISON—a name known to the far corners of the earth, a common word in every language. Edison—translated into a universal tongue—light. Few civilized lips but what have spoken his name, few lives but what have felt the beneficent influence of his handiwork. Snuffed out is the spark that animated his physical genius, yet burning ever more brightly is the light that made him humanity's greatest modern benefactor.

"The world can never sufficiently mourn his passing. The contributions of his genius will remain forever indelibly engraved upon the pages of the life of mankind. Through him the human voice became immortal; pictures took life and moved; darkness dissolved at the touch of a finger; space became the carrier of entertainment.

"The pages of history reveal no other man who so revolutionized the life of the world within the span of his allotted years. Electric light, the telephone, the phonograph, motion pictures, to choose but a few of the thousand odd inventions that bear his name—any one of these would bring fame to any man. Who of us can picture today a world without them? What satisfaction it must have been to Edison to have perfected these things and then lived to witness human enjoyment of them.

"He lived to see the fruits of his genius provide work for one man in ten; to give employment to whole industries whose investment and output exceed the value of the world's gold.

"With Edison invention was organized work. He recognized a human need and then set his brain to the task of meeting it. He translated the dreams, the theories of pure scientists into practical, everyday working tools available for all men. To the thoroughness of his methods the electrical industry can testify. Not only did he perfect the electric lamp but he developed a complicated system of generation, distribution and measurement which made its universal application possible. In giving humanity the comforts and conveniences of electricity alone, he won for himself world-wide recognition as a public servant.

"Yet great as have been his material contributions to human welfare, there is another side to the life of Edison. His human qualities have endeared him to his fellowmen. His modesty, his encouragement of youth, his philosophy of working and living, his courage in the face of obstacles—these mark him as a great man as well as a great inventor. Edison, too, justifies more than any one man, the ideals of Americanism. From the humblest beginning he rose by his own initiative to the pinnacle of world citizen.

"Thomas Alva Edison belongs to no generation—he is of the ages. His genius has brought comfort, convenience, happiness and pleasure to past and present generations, will bring more to those to come. As long as man survives the name of Edison will stand for public service. Of Edison the world may always say, 'If you would see his monument, look around.' "

In solemn honor to the memory of this great humanitarian, the centennial of whose birth is this month, ELECTRICAL WEST reprints this eulogy from its November 1931 issue.

YEARS AGO Thomas "Aladdin" Edison rubbed a lamp and the electrical industry as we know it now was born. Its social, material, industrial and spiritual ramifications the historian of 3000 A.D. *may possibly be able to estimate, but we cannot. We can count, by mathematics such as only an Einstein might understand, the physical wealth that hangs by the burnt fiber in a vacuum, but even with the aid of calculating machines that think and ledgers that talk we are probably shy several billions of dollars. Of the other values created by the lamp of Aladdin we can have no approximation. We are in the realm of the infinite, where the "blindest bluffs hold good, dear lass, and the wildest tales are true." Let the bards turn to yesterday for romance; we know she is with us today and leading us into the bright and brave promise of tomorrow. We recognize her not only when she flashes across the sky with the air mail, but when she perches in the grimy cab of the coal dumper beside the sooty-faced operator whose levers do the work of a thousand sweating men. She rides on the radio waves and she runs the washing machine. Her glamour is no less now that she has gone to work than when she sang songs among the sirens as Ulysses passed, bound to his mast. And where once only a few adventurers might follow her fleeting footsteps, the lamp of Aladdin now lights her trail for us all. In this extension of the frontiers of achievement we have all had a part. Knowingly or unknowingly, we further the vision. But the vision itself must be that of genius. Invention is not accident, but design.*—Berton Braley.

Inspectors Ordinance

So. Calif. Chapter draft issued for study soon

Model ordinance, prepared by inspectors, was presented in its completed form to the last meeting of the Southern California Chapter, International Association of Electrical Inspectors at Burbank. Ken Howard, South Gate, chairman of the ordinance committee, read the draft, which will be mimeographed and supplied to all members for reading and discussion at the Jan. 29 meeting at Anaheim.

Howard was elected chairman of the chapter after resigning as chairman of the committee, succeeding Paul Rodet, chief of the electrical division, Los Angeles. Larry Trim, Burbank, was named the new chairman of the ordinance committee. Ed V. Muller, California State Division of Industrial Safety, was elected secretary-treasurer when Herbert Ufer, Underwriters' Laboratories Inc., asked to be relieved since he is now secretary for the Southwestern Section.

Inspectors discussion covered: wrong switch connections through the housings of the switches rather than through a gutter, contractors jumping the gun and using the 1947 Code before it is officially out, suggestions for uniform rules for installation of nonmetallic sheathed cables underground.

Two manufacturers' men addressed the meeting. Elbert Kramer, Westinghouse Electric Corp., told what the new adequate wiring specifications for certification will be in California, as agreed upon by the Pacific Coast Electrical Assn. and utilities in all regions, and approved by the National Adequate Wiring Bureau. Frank T. Landon, Aluminum Co. of America, told of new aluminum conduit, bearing Underwriters' label, and its uses. L. W. Grayson, superintendent, Light Department, Riverside, explained present-day utility difficulties in getting transformers and equipment to serve customers.

IES Committees

At the first fall meeting of the Washington State Chapter Illuminating Engineering Society, held not long ago in Seattle, officers and committee chairmen were announced. Chairman of the chapter is B. T. Heinz, Silvray Lighting Inc., Seattle; secretary-treasurer, K. E. Hollingsworth, Puget Sound Power & Light Co., Seattle. On the Board of Managers are Elmer H. Smith, Westinghouse Electric Supply Co., Seattle; Frank T. Anderson, Westinghouse Electric Co., Seattle, and Chester W. Hills, City Electric and Fixture Co., Seattle. Committee chairman appointees are: activities, Beverly A. Travis; attendance, William D. Williams; data sheet, B. A. Travis; education, Paul Davis; home lighting, Mrs. Edith Rauch; membership, William H. Creech; Puget Sound Council of Engineering & Technical Societies, delegate, B. A. Travis; alternates, Paul L. Marble and Elmer H. Smith; sustaining membership, C. T. Bakeman; programs and papers, Emory C. Branch; publicity, Ted Birchard.

East Bay Electric Club officers at the annual Christmas party: Ed Buttner, vice-president; Walter Vance Jr., program chairman; Arthur Brewer, Salvation Army speaker; James Land, president; D. H. Rolfe, secretary, and Walter Riley

Remain in NECA

San Francisco Electrical Contractors Assn., for the past year in internal conflict over affiliation with the National Electrical Contractors Assn., decided at a quiet meeting, Dec. 19, to renew that affiliation and to consider changes in its by-laws which will incorporate NECA policies with particular reference to the forthcoming employee pension plan. Paul Geary, executive vice-president of NECA, addressed the meeting briefly, reviewing the functions that the national and the local association or chapter respectively have and their relation to each other.

● DAIRY and ice cream companies have been made the defendants in a complaint filed with the Federal Trade Commission by the Refrigerator Contractors Assn. of Northern California, San Francisco, affiliated with the National Association of Refrigeration Contractors. The complaint charges that these companies give away, lease, buy or sell refrigeration equipment at ridiculously low prices to get and hold dairy and ice cream business of their customers, thus making unfair competition.

● RESISTANCE WELDING was the topic that was both illustrated and explained at a recent meeting of the Electrical Maintenance Engineers Assn. of Northern California, at PG and E shops, San Francisco. K. M. Ryals, Stone Ryals Electric & Mfg. Co., explained the differences between arc welding and resistance welding. Then the General Electric motion picture, *This Is Resistance Welding*, was shown by A. P. Golf, of that company. Following the picture, questions were answered by O. G. Carpenter of Stone-Ryals, Al Boardman of G-E, and V. S. Chapman of Taylor Winfield Co.

● ELECTRICAL CONTRACTORS of the San Joaquin Valley were presented the General Electric Lamp Dept. store lighting sales training classes in two meetings, recently, at PG and E auditorium, Fresno. Sam Hazelton Jr. and Ruben Lagerstrom gave the concentrated course which Walter Carlson introduced. Similar meetings were held the previous month in Oakland.

● LIGHTING IN MODERN STORE DESIGN was the subject at the Jan. 7 meeting of the Southern California Section, IES, at Eaton's Chicken House, Los Angeles. Speaker was Gene Burke.

Across the Nation THIS SIGN IDENTIFIES THE LOCAL SAMSON SERVICE AGENCY

TO PROMOTE GOOD WILL, and to save time and shipping costs, SAMSON has set up a nation-wide system of Certified Service Agencies . . . each identified by the sign pictured above.

These agencies stock authentic SAMSON parts, and are factory-trained to provide quick, efficient repair service . . . to both *dealers* and *customers* . . . on models of SAMSON Electrical Appliances manufactured after January 1, 1946, with the exception of Heating Pads. *All Heating Pads must be sent to the SAMSON factory for repairs.*

Orders and inquiries for servicing the above-specified products, including no-charge repairs and adjustments under the SAMSON guarantee, should be referred direct to the nearest Certified Service Agency. For name and address, consult the list below.

CALIFORNIA
Los Angeles 14
California Electric Service Stations
1518 W. 7th Street

Oakland
California Electric Service Stations
166 Grand Avenue

San Diego
Electrical Appliance Service Corp.
302 17th Street

San Francisco 5
California Electric Service Stations
400 Mission Street

COLORADO
Denver 4
Midwest Electric Wiring Co.
323 W. Colfax Avenue

DISTRICT OF COLUMBIA
Washington 1
C. A. Leppert
914 Eye Street, N.W.

GEORGIA
Atlanta
Woodall Electric Appliance Co.
1024 Boulevard, N.E.

ILLINOIS
Chicago 54
Nolan H. McCleary Co.
1467 Merchandise Mart

IOWA
Des Moines
Service Sales Company
1600 Locust Street

LOUISIANA
New Orleans
Royal Supply Company
640 Baronne Street

MARYLAND
Baltimore 2
The Electric Motor Repair Co.
340 Fallsway

MASSACHUSETTS
Boston
Clark & Mills Electric Co.
75 Newberry St.

MICHIGAN
Detroit
Cooley-Van Howe Service Co.
744 Michigan Theatre Bldg.

The Detroit Edison Company
2000 Second Avenue

MINNESOTA
Minneapolis
E. B. Kelly & Co.
214 South Seventh Street

MISSOURI
Kansas City 6
Boese-Hilburn Electric Co.
123 West 8th Street

St. Louis
Koemmerlen Electric Company
2318 Locust Street

NEBRASKA
Omaha
Sterling Electric Company
2013 Farnam Street

NEW YORK
New York 10
Appliance Sales & Service Co.
303 Fourth Avenue

OHIO
Cincinnati
Burgess Electric Company
334 E. 5th Street

Cleveland
The Kane Company
2621 E. Ninth Street

Dayton
Burgess Electric Company
2232 N. Main Street

OKLAHOMA
Oklahoma City
Wetherbee Electric Co.
412 N. Hudson

OREGON
Portland 4
Brossie Electric Company
909 S. W. 5th Street

PENNSYLVANIA
Philadelphia 7
M. E. Arnold & Co.
1316 Walnut Street

Pittsburgh
Quick Service Electric Co.
1012 Jenkins Arcade

TEXAS
Dallas
Douglass Electric Appliance Co.
1323 W. Davis Street

UTAH
Salt Lake City
Time and Instrument Company
57 Richards Street

WASHINGTON
Seattle 1
Electric Engineering Company
2012 Third Avenue

WISCONSIN
Milwaukee 5
Charles W. Schneck Company
1333 North 12th Street

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THIRTY YEARS OF PIONEERING IN ELECTRIC WATER HEATING

Pioneering a new industry is not an easy task. New trails must be broken, prejudices overcome and principles proved by the acid test of experience. The Clark stands first in electric water heating today because the principles it pioneered thirty years ago have stood up under toughest service in all kinds of waters.

That we are constantly striving to build into Clark even better performance and longer life is evidenced by the latest development to come out of the Clark research laboratories — Ionodic protection against corrosion. Tank life more nearly approaching that of the Clark element is assured, even in highly corrosive waters. The coming years will certify that in pioneering this improvement Clark has once again proved its leadership in electric water heating.

McGRAW ELECTRIC COMPANY
CLARK WATER HEATER DIVISION
5201 W. 65th STREET, CHICAGO 38

CLARK
ELECTRIC WATER HEATERS
A Toastmaster Product

● THE PENINSULA Electrical Contractors Assn. held a dinner for the installation of its officers at the Belmont Casino, Belmont, Calif., Jan. 17. W. F. Klose, Klose Electric Co., San Carlos, was re-elected president, Mervyn Mayer, Pacific Electrical & Mechanical Co., San Bruno, vice-president, and Joseph Dingman, re-elected treasurer. Directors, in addition to the officers, are: Everett Marshall, Redwood City, William Biber, San Carlos, and, E. A. Mueller, Redwood City. William J. Varley, executive secretary and manager, was presented a gift in gratitude for his efforts during the past year.

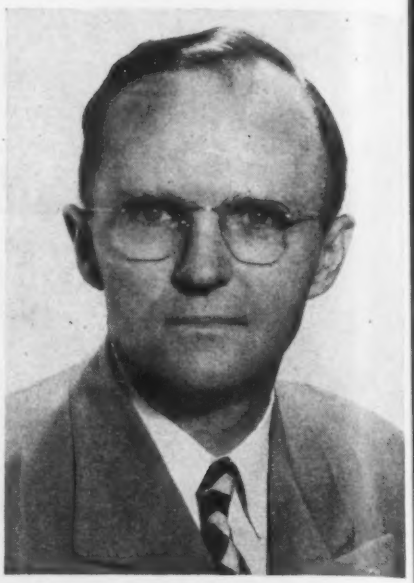
● PUGET SOUND Chapter, IAEI, discussed electrical house heating at its regular quarterly chapter meeting at Olympia, Wash., recently. Sterl Anderson, director of the Department of Labor & Industries, for the state, also told of the operations of the department. At the election of officers, Victor M. Kirsop, Olympia electrical inspector, was elected chairman, L. B. Barsf, vice-chairman, and, C. S. Alger, Puget Sound Power & Light Co., was re-elected secretary-treasurer. The next quarterly meeting will be in Seattle about March 1.

● RALPH FARNHAM of General Electric Co. Lamp Dept., Cleveland, gave a talk and demonstration of photo flash tubes to the Jan. 22 regular meeting of the Washington State Chapter of the Illuminating Engineering Society, in Seattle. Farnham also gave a demonstration and lecture to a group composed of electric and photographic people at the Community Playhouse, San Francisco, on Jan. 16.

● HOSPITAL LIGHTING was the subject presented by L. Robson and R. E. Simpson at the Jan. 9 meeting of the British Columbia Chapter, IES, at Canadian Forestry Bldg., Vancouver, B. C. At a previous meeting Edgar A. Skidd talked on *The Function of the Eye in Seeing.*

● R. BOLLAERT, Engineering Service Division of Westinghouse Electric Corp., addressed the East Bay Electric Club, Oakland, Jan. 13, giving a demonstration of applications of high-frequency induction and dielectric heating. The East Bay club is preparing a roster of membership which will be issued soon to all members.

● ELECTRONICS IN INDUSTRY was the topic discussed by Dr. James MacPherson, University of Southern California, at the Jan. 15 meeting of the Electrical Maintenance Engineers Assn. of Southern California, in Los Angeles. The moving picture, *Unseen World*, describing the mechanism of the electron microscope, was also shown.



Elmer Weinheimer, Western regional field director, National Electrical Retailers Association, touring the West

● CONSIDERATION is being given by the Electric Club of Washington to the sponsorship of a bill in the Washington legislature to amend the electrical contractors' license law. A legislative committee was appointed by president T. M. Widrig to forward the plan. It consists of R. B. Lane, electrical contractor, as chairman, assisted by O. A. Alderman, representing manufacturers, Harry Gerster, wholesalers, Wallace Watts, dealers, William Gaunt, union labor, Don Gawne, City Light department, Al Pollard, Puget Sound Power & Light Co., and, Roy Kistler, Pacific Tel. & Tel.

● MONTANA CHAPTER, International Association of Electrical Inspectors, has set the date for its annual meeting at Great Falls, Montana, as April 11 and 12. It is probable that the Utah and Rocky Mountain Chapters will coordinate the date for their annual meeting in early April.

● POSSIBILITY of a central, cooperative winding shop for all members of the Bay Cities Chapter of Industrial Service Assn. is being studied by a committee headed by Lloyd Flatland, Globe Electric Co.; W. Schultz, Atlas Electric Co., and W. E. Boyd, Pacific Electric Motor Co.

● THE GUARANTEED wiring program suggested by the National Electrical Contractors Assn., was the subject up for consideration before the Utah Chapter, NECA, recently.

● DECISION was made by the Electrical Maintenance Engineers Assn. of Southern California to cancel its usual table-top exhibition and to sponsor instead an electrical industrial show, March 21-22, at Rodger Young Auditorium, 936 West Washington Blvd., Los Angeles. The organization also announced a new electronics course of twelve lessons, one night a week, to begin soon and to cost $6 apiece for those taking the work. The December meeting, usually the table-top exposition, was a Christmas fellowship party instead, Dec. 18.

● FIRST big social event of the Marin County Electrical Contractors Assn. was held Dec. 13, at Le Chateau, north of San Rafael, honoring the new officers: M. J. Lamperti, North Bay Electric Works, president; Jack Cimino, vice-president; T. Johnson, Al Lordeaux, Oliver Duer, directors, and W. J. Varley, manager; Mrs. F. S. Maoli, secretary. Guests included Ed Sablastian, assistant business manager, International Brotherhood of Electrical Workers, Local No. 6, and Jack Shaw, Marin County representative.

● UTAH CHAPTER, International Association of Electrical Inspectors, plans meetings in Provo and Salt Lake City on the first Tuesday of the next two months, according to D. J. Wolters, secretary. Code instruction will be the program.

● ROCKY MOUNTAIN Chapter, Illuminating Engineering Society, recently heard R. H. Erwin discuss how the architect and lighting engineer can work together for the benefit of the client.

When R. M. Oliver of Proctor talked to San Francisco Electric Club recently

SOLDERLESS—TAPELESS

Wire Connectors

SOLAR

SCRU-ITS

"MR. SCRU-IT" (Trade Mark)

Solar SCRU-ITS are used for connecting two or more wires without tape, solder, flame or tools. They are economical and easy to use—wire ends are stripped and SCRU-ITS screw right on to form a compact and efficient joint.

SCRU-ITS give better mechanical and electrical contact . . . eliminate possibilities of shorts, grounding and corrosion. Their compact size permits their use where working space is at a minimum.

Available in several sizes for connecting various combinations of wires.

EASY TO USE:

1. STRIP WIRE

2. SCREW IT

3. THAT'S IT with SCRU-ITS!

DON'T TAPE
DON'T SOLDER
"SCRU-IT"!

• MADE IN FOUR SIZES

• MAY BE USED WITH SOLID OR STRANDED WIRES

MILLIONS IN USE • HUNDREDS OF APPLICATIONS

"Roughing-in" or permanent wiring is simplified with SCRU-ITS . . . they thread on with a twist of the wrist . . . and the joint is complete!

- Fixtures
- Outlet Boxes
- Fuse Boxes
- Panel Boards
- Switch Boxes
- Lighting Devices
- Conduit Boxes
- Circuit Breakers
- Switch Controls
- Motor Connections

and many others.

U. S. PATENT NO. 1,933,555

Write for Data Sheet Z-2

For complete specifications on SCRU-IT sizes, uses, prices, etc., WRITE TODAY.

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FACTORY and SALES OFFICES

WARREN, PENNSYLVANIA

PCEA *Panorama* — *Edited by A. X. Schilling*

Joint PCEA—PCGA

Customer, credit and commercial discussions

Thirty delegates, representing 14 gas and electric utilities, met in San Francisco on Jan. 23, 24 for a joint meeting of the PCGA commercial problems group and the PCEA credit and collection group. E. J. Wright was sponsor and conference chairman.

The group discussed the following topics:

Customer Accounting

Items on customers' bills. Is more information shown than required?

Billing and other problems on unmetered accounts.

Scope of internal audits of customers accounting and billing.

Preparation of delinquent account information by customers' records department.

Methods of reporting collections by collectors, cash receivers and pay stations.

Credits and Collections

Ways and means of training new collectors.

Will collecting by mail continue to be effective?

Collection follow-up practices in handling normal and hazardous accounts.

How complete should a history file be?

Methods and records used to record changes in the credit standing of commercial and industrial consumers.

Status of collections and trend of past-due accounts.

Commercial Problems

Action to be taken on line extensions where installed load is subsequently less than signed for.

Zone meter reading—its relation to office routine.

Processing of applications for service to new homes.

The effect of dispatching customers' service orders by radio on commercial office methods and procedures.

Reading meters in ending multiples of 10 kw.

● NORTHERN members of the technical subcommittee of the code and ordinance committee met in San Francisco on Jan. 23 to consider revisions for the 1947 edition of the uniform electrical code in order to bring it into conformity with the new national electrical code. Present at the meeting was R. E. Arbogast, chairman of the southern half of the committee, who discussed some of the revisions that have been suggested by electrical inspectors and by committee members, which had previously been considered during the earlier meeting of the committee's southern half. When statewide agreement has been obtained on the proposed revisions, the new edition of the uniform electrical code will be issued.

Steam Group

Thirty-one members, representing 17 companies, including Central Arizona Light and Power Co., Phoenix, and the Hawaiian Electric Co., Honolulu, attended the meeting held in Los Angeles on Dec. 13 by the steam generation group of the Operating Economics Section. Donald R. Jenkins acted as sponsor.

Open-forum discussions were conducted on the following subjects: maintenance policies with respect to the composition of plant organization, the contracting of certain classes of work, etc.; operating and maintenance records and standards for routine checking of performance for preventative maintenance; special maintenance problems, including lubricants, washing of superheaters, intake tunnel cleaning, acid cleaning of condensers and boilers; and special engineering.

Takes the Torch

Arrangements are being made by Hollywood Wholesale Electric Co., Hollywood, to promote adequate wiring among the contractors served by the firm. Howard Stultz, president, and Jack Bissett, general sales manager, have taken a genuine interest in the program and plan a series of educational meetings for their own salesmen who, in turn, will promote adequate wiring among the contractors. The firm's interest in the promotion of adequate wiring was sparked by the talk given by Elbert Kramer, chairman of the adequate wiring committee, during the NEWA in Sonoma.

● THE BOOKLET devoted to promotion of the adequate wiring program is in process of preparation. As it is now planned, it will be in two colors and illustrated. The program will be covered in general and applied to specific rooms in a home, with clear explanations of the steps required to secure an adequate wiring certificate. Distribution will be made by members of the association to persons who plan to build new homes or remodel existing homes and the emphasis will be on the conveniences and money-saving advantages obtained from an adequately wired home.

Getting Acquainted

Columbus beat him to it by 403 years, but he and the gentleman we'd like to present this month both saw America first on the same day of the month—Oct. 12. The man to be presented in this issue was born in 1895, in Los Angeles, where he attended elementary school and found time to fiddle and fool with the knobs and tubes so plentiful in his father's shop. After attending high school in Berkeley and U. of C., he started to work full time in his father's firm in 1915, and stayed with it until the firm was sold, only taking time off to become an ensign in the Navy from 1917 to 1919. He joined Western Electric Co. as country salesman in 1923, and in 1931 became connected with his present firm, working in Los Angeles until 1943 when he was transferred as district manager to San Francisco. He's there now.

He was active in the Electrical Development League of southern California, serving as vice-president in 1938 and as president in 1940. He's been on the PCEA industry information committee since its inception, has served more than once on the adequate wiring committee and now is on the membership committee and an active member of the Northern California Electrical Bureau.

He's an SAE, a member of the Electric Club, Olympic Club, IAEI and the American Legion, all of San Francisco. With his wife, he lives in San Francisco, where you'll find him on a golf course now and then. He admits that he may never be a champion golfer, but you'll notice that he enjoys trying to score like one.

Now that you know all about him, take a look at his name and photo on page 147.

Have you registered at the "University of Light"?

THE NEW GENERAL ELECTRIC LIGHTING INSTITUTE OFFERS A UNIQUE TRAINING OPPORTUNITY

Courses Planned at the General Electric Lighting Institute in 1947 include:

- Twelve 5-day courses in Fundamentals of Commercial and Industrial Lighting and four 3-day courses in Home Lighting Fundamentals, giving the basic groundwork for those new at the art.
- Six 5-day refresher courses in Advanced Commercial & Industrial Lighting and two 3-day advanced courses in Home Lighting, to bring experienced lighting men up to date.
- Two special conferences for Utility Lighting Directors, at which street lighting will be an important topic.
- Short courses and conferences for groups having special interest in a particular field of lighting—school executives, architects, office building managers, factory managers, merchandising executives.

Contact your G-E Lamp District Office for schedules and detailed information.

• Rapid advancement of lighting in 1947 will depend largely upon widespread knowledge of modern techniques. That's why General Electric has placed top priority on the important educational job that is being done week after week at the new General Electric Lighting Institute. Here at the "University of Light" is the training center of the industry, manned by a faculty drawn from the host of General Electric specialists in all fields of lighting.

We invite utility companies to make arrangements now with any G-E Lamp District Office to send their key men to Nela Park for fresh inspiration and up-to-the-minute instruction on "What's new in lighting". These courses are most popular, so register soon. General Electric Co., Lamp Dept., Nela Park, Cleveland 12, O.

G-E LAMPS

GENERAL ELECTRIC

NEWS of the industry

PUGET POWER PURCHASE REMANDED FOR REHEARING

In an "off again-on again" series of moves in Olympia Wash., Chief Justice Joseph A. Mallory of the Washington Supreme Court on Jan. 14 remanded the $135,000,000 Skagit County PUD purchase of the Puget Sound Power & Light Co. for rehearing on Jan. 30. Previously he had held that the four to four tie vote on the decision represented a victory for the PUD.

The tie vote on upholding a decision of the Skagit County Superior Court had been occasioned by the absence in Europe of the Supreme Court's chief justice. The lower court had held that the purchase was legal.

The case originated when directors of the Skagit PUD authorized the issuance of $135,000,000 in revenue bonds for the purchase of the Puget Sound power properties, which would then in turn be parceled out to a group of PUD's in the area in which the company operates. To test the legality of the deal, the PUD secretary refused to sign the bonds and the commissioners brought a friendly suit.

In the rehearing the case was being argued before a full 9-judge court two of whose members were new.

Possibility of a rift in the ranks of the PUD's for whom the Skagit district was acting as agent was indicated on Jan. 20 when the Gray's Harbor PUD commissioners voted to withdraw their previous authorization to the Skagit commissioners.

Torrance Plant Operation Declared Not Feasible

Power shortage and competitive energy costs preclude future operation of the $25,000,000 war-built Torrance aluminum reduction plant in southern California according to utility officials in that area. The plant has been offered for sale by the WAA.

Samuel B. Morris, chief engineer and general manager of the Los Angeles Department of Water and Power, has said that, although his organization furnished 200,000 kw. for the plant during the war, there is no longer any surplus power available for this type of load. Other utility men pointed out that the low rate required for aluminum reduction was not attractive. Furthermore, it was emphasized, the energy required to supply this one plant with a maximum employment of 1,000 workers, would be sufficient to supply the needs of other diversified industries employing 70,000.

WAA officials say they hope to sell the plant for other purposes and have agreed to move out its rectifiers and other special electrical equipment. There has been some speculation that the plant might be dismantled and sold for export.

Shoshone River Project Rejected by USBR

Construction of a dam and hydroelectric plant on the Shoshone River near Cody, Wyo., sponsored by the City of Cody and the Wyoming Highway Commission, has been rejected by the Bureau of Reclamation. USBR engineers point out that prior irrigation requirements would reduce the water flow at the Cody site to such an extent that generation of any substantial amount of firm power would be impossible.

Power Appropriations Under Scrutiny

Funds for federal power operations were expected to receive close scrutiny and possible paring as the House appropriations committee began hearings on major appropriation bills late in January. Bills for War, Interior and Agriculture departments included funds for power developments in the Far West.

Central Valley, Bonneville and REA appropriations were slated to receive special attention. The Central Valley project's funds were cut from $20,000,000 to $12,685,622 by the last Congress. Bonneville is reported to have already received a $10,000,000 slash in its request at the hands of the budget bureau. REA loans and expenditures have been severely criticized recently by members of Congress.

● To Bring Railroads, power companies and other public service industries more nearly in line with assessed valuation on non-utility buildings, the Utah Tax Commission plans decreases in assessed valuation on public utilities. J. Lambert Gibson, commission chairman, told county assessors that assessed valuation of public utilities in the state is far above 30% of market value, a basis for assessing other property in the state.

NORTHWEST UTILITIES, BPA MAY RESOLVE DIFFERENCES

Economic necessity and political expediency may resolve the differences between utilities in the Pacific Northwest and the Bonneville Power Administration. In a series of conferences held in Seattle and Tacoma during January, joint strategy was worked out to offset the reported determination of Eastern congressmen to reduce drastically the BPA appropriations for 1948.

Increasing power demands are taxing the ability of the Northwest Power Pool and in January the peak was the largest the pool has carried, exceeding 2,500,000 kw. and within 150,000 kw. of the maximum output capacity of the interconnected systems. Steam plants were operating at maximum capacity with 60,000 kw. of steam generated power going from Tacoma and Seattle municipal plants to eastern Washington and Montana.

Attending the conferences were representatives of Portland General Electric Co., Northwestern Electric Co., Pacific Power & Light Co., Washington Water Power Co., Puget Sound Power & Light Co., Seattle City Light, Tacoma Department of Public Utilities and BPA. Among the agreements reached were the following: (1) that the federal government, as the operator of the BPA projects, should assume responsibility for the future power production requirements of the region; (2) that the government should assume responsibility for building backbone transmission lines from its hydro plants to the major load centers; and (3) that the principal utility distributors of BPA power and the government should prepare a joint program for future expansion of federal generating and transmission facilities in the Pacific Northwest. For its part BPA assertedly agreed to enter into temporary 3-year contracts with the distributing utilities pending the working out of long-term contracts.

A jointly approved 10-year program for expension of federal power facilities in the Columbia Basin is being worked out for presentation to Congressional appropriation committees early in February. It is expected that it will be a modification of the $241,786,000 projected development for the 1948-53 period prepared by BPA.

● Nearly 4 billion kilowatt-hours were turned out last year by generators at Grand Coulee, USBR reports.

BETTER LIGHT... *for Better Sales*

The new Railley Table Lamps give you *more* than smart new styling; they offer exclusive better-light features... *extra* talking points that turn "lookers" into "buyers."

Such new Railley developments as the Deep-Set Socket (described at the right)... the Inverted Socket...the Luminous Glo-Switch...are the result of research, design, and manufacturing facilities unequalled in the industry. They make it easy to clinch sales of Railley's varied line of well-styled lamps. Write for complete catalog.

Deep-Set Socket Spreads More Light Over Greater Area

Railley's new Plastisocket is set deeply into the base of this lamp, eliminating the unsightly, conventional metal socket and materially lowering the light source. The advantages are two-fold:

1. Lower light source means greater intensity of light at any given point on the table surface.

2. Because the source is lower, direct lighting travels at a wider angle, lighting a much greater area.

Railley Lamps give more light for the money

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ORIGINATORS OF THE
PIN-IT-UP LAMP
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RAILLEY CORPORATION • CLEVELAND 8, OHIO

THE NEW McGILL *Vaporproof*

Portable Lamp Guard . . . strong, portable, sealed. It is water-tight, vapor-tight, dust-tight and moisture proof. The plastic handle, and fibre cage are shock proof and non-sparking. A rubber gasket has now been placed between the cage and handle, and absorbs all stress and strain, preventing breakage. The heavy glass protecting globe eliminates possibility of breakage of the lamp bulb inside from splashing liquids. Being air-tight these guards are perfectly safe for use where vapor and dust infused air is prevalent. They have no equal for safety, service and convenience around flour mills, paint booths, finishing rooms, airports, warehouses, food processing plants, shipyards, aboard ships, and many other places.

The No. 3007 has the plastic cage. The No. 3006 has a heavily tinned, electrically welded wire cage.

ELECTRICAL DIVISION

McGILL

MANUFACTURING CO., INC.

VALPARAISO, INDIANA

SACRAMENTO TAKEOVER ENDS LONG CONTROVERSY

Sacramento Municipal Utility District took over the distribution facilities of the Pacific Gas and Electric Co., in Sacramento County on Dec. 31, 1946, culminating 22 years of effort to acquire the property. The district paid $13,345,000 for the system which serves 63,000 customers in a 650-sq. mi. area.

Included in the deal was a contract under which PG and E will supply the district's power requirements for seven years at a rate of 5.8 mills per kwh., the lowest rate for firm power the utility has granted to any municipal customer.

Some 200 PG and E employees transferred over to the district as a result of special concessions by the directors which granted them equal or better salaries and assured them that full pension rights would be protected under civil service. District employees total 400.

The transfer ended years of negotiations and court battles which went all the way to the U.S. Supreme Court. Final valuation was fixed by the California Utilities Commission.

Utility Asks Commission Jurisdiction over Co-op

The California Public Utilities Commission has been asked by California Electric Power Co. to take jurisdiction over the Mesa Electric Corp. Inc. and to prohibit it from constructing a power line paralleling company facilities. A 46-page brief filed by the power company on Jan. 9 followed an earlier request to the commission. It criticised what it termed the bureaucratic policies of REA and other government agencies and contended that REA is not so much concerned with getting electricity to rural areas as it is with getting it to them through REA.

E. F. McNaughton, public utility advisor on the commission, said that the matter would be taken to court as a test case.

Suit Filed to Prevent Duplicating Lines

Central Arizona Light & Power Co. has filed suit to restrain the Ma-Yu Electric Cooperative from constructing lines paralleling its service area.

According to M. O. Best, board chairman, the company has no intention of trying to prevent the REA from building lines into areas which otherwise would not receive electric service, but believes that government funds should not be spent where existing utilities either have already built lines or where they are able and willing to build them.

A $1,915,000 expansion program in Arizona has been announced by REA cooperatives. It includes 2,000 mi. of distribution lines to serve approximately 3,600 farms. Applications before REA include Nyco Electric Cooperative at Salome, $200,000; Trico Electric Cooperative at Marana, $500,000; Mohave Electric Cooperative at Kingman, $230,000.

Piecemeal Construction Challenged in Oregon

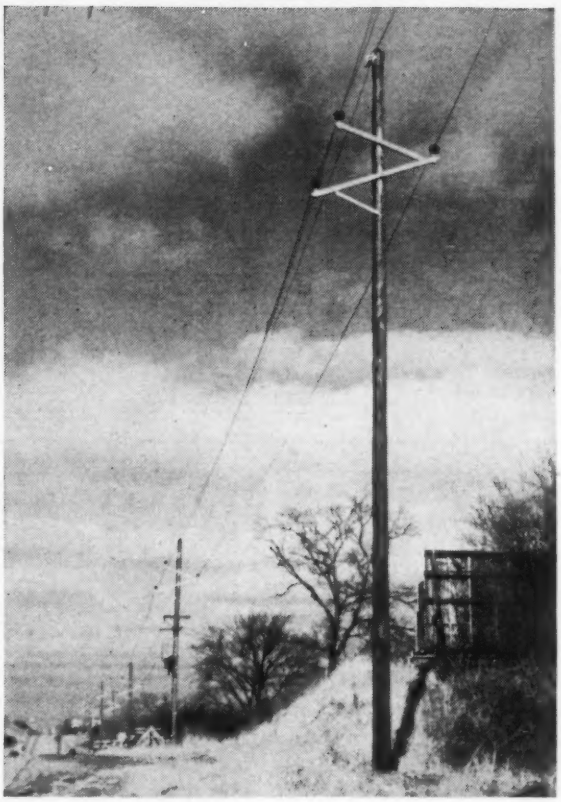
Suit to prevent Union County (Ore.) PUD from establishing an electric system to serve only part of the district has been filed at LaGrande by California-Pacific Utilities Co. and nine customers. Following failure of negotiations to buy the former Eastern Oregon Light & Power system last year, the PUD planned to use $450,000 of an authorized $925,000 bond issue for construction of a small system. The complaint charged that piecemeal construction would dissipate the district's money without providing complete service.

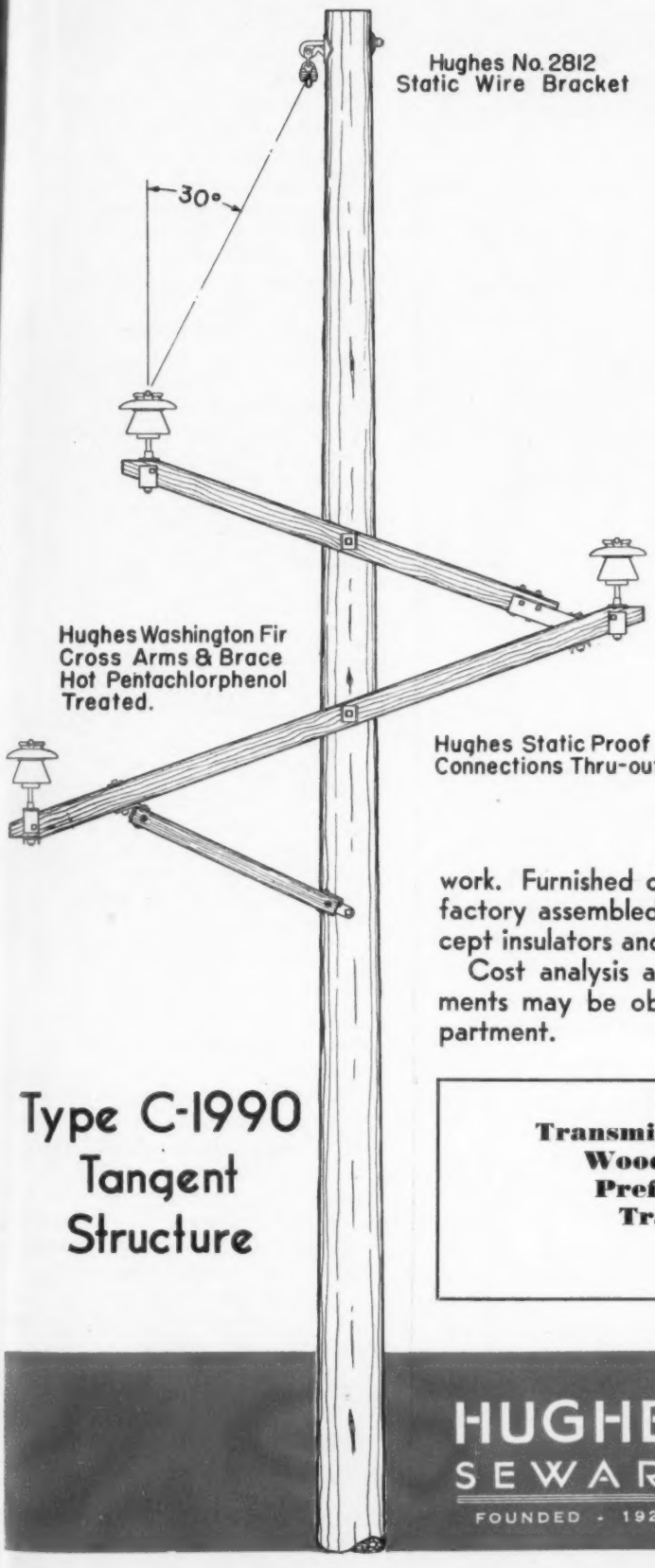
● East Polk County (Ore.) could successfully finance purchases of existing electric facilities over a 30-year period, according to a recent report of the state hydroelectric commission. Petitions have been filed asking for creation of a PUD encompassing 97 square miles with an estimated population of 4,100 and assessed valuation of $2,632,000. The area is served by Mountain States Power Co.

● Revenues of power companies serving the area are sufficient to justify investment of $4,892,000 in an electrical system proposed for Umatilla County (Ore.) PUD, the Oregon state hydroelectric commission has reported. The proposed district includes 1,270 sq. mi. It has a population of 28,500 and an assessed valuation of $32,140,000. Utilities now serving the area are Pacific Power & Light, Athena Light & Power and Umatilla Electric Co-op.

● Okanogan County (Wash.) PUD commissioners have requested a special election on the proposition of selling a section of transmission line in their district to the Bonneville Power Administration for $192,290. The proposal was voted down by a narrow margin at the last general election.

HUGHES
Wishbone Construction





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Tangent
Structure

Because of the excellent cone of protection provided by the shield wire, the offset conductors, clearance from conductor to pole or arm and because of its simplicity, Hughes Series C-1990 Wishbone Construction has recently become very popular with Engineers and Operating men thru-out the country. Comments from the field are very favorable particularly with reference to "Hot Line" work. Furnished complete for single or double arm construction, factory assembled with all necessary hardware for installation except insulators and insulator pins.

Cost analysis and scale drawings for your particular requirements may be obtained by consulting Hughes Engineering Department.

MANUFACTURERS OF
Transmission and Distribution Structures
Wood and Steel Switch Mountings
Prefabricated Wood Substations
Transmission Line Hardware
Special Steel Items
Special Wood Items

HUGHES BROTHERS
SEWARD, NEBRASKA
FOUNDED - 1921 INCORPORATED

B. C. ELECTRIC SIGNS LABOR AGREEMENT

Increase of 12.5% across the board, a two-week annual vacation with pay and revision for three categories of journeymen to the prewar 40-hour week are the chief points in a new agreement announced jointly by the B.C. Electric Railway Co. and Locals B-213 and 230 of the International Brotherhood of Electrical Workers, AFL.

Negotiations have been in progress since June 1946, and terms of the settlement are retroactive to that date. More than 500 men in the Lower Mainland and Greater Victoria area are affected by the agreement, which, according to L. B. Jack, will cost the company between $200,000 and $250,000.

● ELECTRICAL WORKERS were granted wage increases ranging from two to nine cents an hour in an agreement at Vancouver, Wash., between the Clark County PUD and Local B-125 of the IBEW. The increases became effective Jan. 1.

WELL KNOWN BRANDS

In the West, Marwood distributes, with pride *and confidence,* the products of leading manufacturers... each a leader in his field.

Nationally recognized products coupled with Marwood's record of over 20 years service to the Industrial West is your insurance of dependable service.

MARWOOD *Serves* WESTERN INDUSTRY

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CONTINENTAL DIAMOND FIBRE CO.
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and these Important Service Factors

Services of Experienced, Factory-Trained Engineers
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Complete Inventory Stocks
Four Strategically-Located Warehouses
Prompt Delivery

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PG and E, IBEW SIGN ONE-YEAR CONTRACT

A one-year contract calling for a 6% wage increase plus $2.50 per week was signed by Pacific Gas and Electric Co. and the International Brotherhood of Electrical Workers, AFL, culminating negotiations which began last October. An identical offer has been made by PG and E to the Utility Workers Union of America, CIO.

The increase, retroactive to Dec. 1, 1946, affects all employees, both clerical and physical, who earn $400 a month or less. It will go to 6,237 employees in units represented by the IBEW and to 1,550 employees not represented by either union. An additional 4,520 employees are represented by the UWUA.

In its October demand, the IBEW asked for a 12% increase, while the UWUA, on Dec. 9, asked for 35c per hour increase.

The company offer to both unions is a compromise between the percentage and the cents-per-hour bases of negotiation. A. Emory Wishon, vice-president and general manager, said the compromise offer was made in a desire to maintain uniformity of wages throughout the system.

Labor Disputes Divide REA Co-ops, IBEW

Labor disputes between REA coops and members of the IBEW have broken out in a dozen places in the Middle West and South. Principal issue is the closed shop, although some involve wages and working conditions. Hostility stems from farmers who work on the average from dawn to dusk with their income dependent upon success of their crops.

● CLARK COUNTY (Wash.) PUD has voted to sell an additional $200,000 in electric revenue bonds to refinance previous loans and provide additional capital for extensions and other improvements. The new issue will be bought by the Ballard-Hassett Co., Des Moines, Iowa, which purchased the district's $1,000,000 discount issue in 1945, financing the PUD's condemnation purchase of Portland General Electric Co.'s Vancouver properties. The new issue will carry a 3⅛% interest rate over a 30-year period.

● NEW MEXICO PUBLIC SERVICE COMMISSION has approved franchises for New Mexico Electric Service Corp., in Hobbs, Jal, and Eunice, in eastern New Mexico. All are for 25 years and provide payment of 2% of gross receipts to the municipalities.

MOUNTAIN STATES POWER MAKES RATE REDUCTIONS

Reductions in electric rates amounting to more than $20,000 annually have been approved for the Mountain States Power Co., the Idaho public utilities commission at Boise has announced. The company has set up new schedules reducing residential rates by a total of $11,595 per year, and commercial rates, $9,279 per year, effective Jan. 1.

● NEW MEXICO PUBLIC SERVICE COMMISSION has held that the Cuba Light & Power Co., which serves the town of Cuba. N. Mex., has "failed and neglected" to render "adequate, efficient and reasonable service" to consumers. H. L. Weise, head of the company, was ordered to make necessary repairs and purchase necessary equipment so as to render such service. The commission set next March 1 as deadline for compliance with the order, and directed Weise to submit monthly reports on his activities and progress.

● COWLITZ COUNTY PUD, Kelso, Wash., is investigating its rates for processed steam and industrial power to large consumers, it was announced recently by Manager C. T. Hurd. Cost studies are being made by H. W. Beecher, Seattle mechanical engineer; Donald J. Lang, Aberdeen CPA; William S. McCrea Jr., Tacoma electrical and evaluation engineer, and the Seattle legal firm of Houghton, Cluck & Coughlin.

● NEW MEXICO PUBLIC SERVICE COMMISSION approved a 10% discount on all electric service charges, for the month of December only, in the Mesilla Valley division of the El Paso Electric Co. Company officials estimated it would result in a saving of about $4,600 to consumers in southern New Mexico.

● CALIFORNIA-PACIFIC UTILITIES Co. has reduced electric rates in California towns, effective Jan. 2. The cuts bring customer annual savings to about $38,900, average about 20% for domestic users and 15% for commercial users in Susanville and Honey Lake Valley, Calif., and 8.3 and 5.6% in Chester, Calif.

● CLEARWATER VALLEY LIGHT & POWER Assn. Inc., Lewiston, Idaho, has announced its third rate reduction since it was established in 1938. The new schedules effect farm and home service, schools, churches and communities halls, service in rural villages.

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The West supports one of America's leading manufacturers of lighting equipment . . . producing quality fixtures bearing a nationally known label. With production concentrated on the Pacific Coast, Smoot-Holman Co. assures western users a dependable source of supply for all types of commercial and industrial incandescent and fluorescent lighting.
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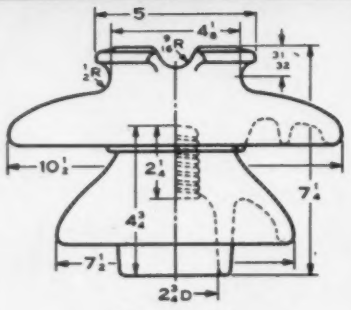
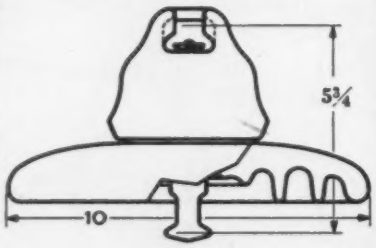


NO. 2124-M
45 Kv. Rating

Dry Flashover . . . . . 125 Kv.
Wet Flashover . . . . . 85 Kv.
Rec. Pin Height . . . . . 8 In.
Std. Pkg. Crate 6

This insulator generally used on 33 Kv. can also be furnished in one-piece design (No. 1924). Mechanical, thermal and electrical characteristics are well balanced insuring long life in service.



NO. 21243
15,000 Lb. Min. Combined M. & E. Rating

Dry Flashover . . . . . 80 Kv.
Wet Flashover . . . . . 50 Kv.
Leakage Distance . . . . . 11½ In.
Std. Pkg. Crate 6

This design is offered in a wide range of spacings in both Ball-Socket and Clevis types which fulfill all strain insulator requirements.

● Service records prove these units will serve faithfully under all conditions. Call our nearest sales representative for speedy delivery.

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SAN DIEGO G&E LAUNCHES NATIONAL ADVERTISING

To help bring new industries into the area, San Diego Gas & Electric Co. recently launched the first national advertising campaign in its history.

The ads stress San Diego's natural harbor and adequate shipping facilities, the labor pool of skilled workers, the adequate supply of electricity and natural gas, the fact that San Diego is the 21st richest agricultural county in the nation and that Los Angeles, the third largest market in the nation, is but 125 miles away.

Each of the ads opens with a statement, by a leading San Diego national manufacturer, emphasizing San Diego's year-around mild climate and the importance this has on wages, health and morale and pointing to the ease of conducting manufacturing operations under these conditions.

The ads are appearing every other month in national magazines. A coupon offers a free booklet, *San Diego as Others See Us*, containing a summary of an industrial survey.

● A SHORT CIRCUIT in one of the panels at Seattle City Light's central substation caused $50,000 damage and disrupted the city's transit system until the load could be switched to Puget Sound Power & Light Co. lines. The power company will carry the transit load for several months until replacements can be secured by the city. Damage at the station would have been greater had not Operator M. M. Kays remained on the job, despite the fact that he was almost blinded temporarily by the flash and by smoke and flames.

● DIRECTORS of the Southside Twin Falls, Idaho, project are urging reduction or elimination of water use for power development at Minidoka Dam, only source of electricity for Burley and Rupert. The board proposal followed water conservation recommendations issued by USBR. It was made as an alternate to the bureau suggestion that a $14,000 domestic water system be developed for Twin Falls, Buhl and farms in the area, eliminating winter usage of canals.

● CLAIMING faulty operation of Seattle City Light's Skagit River dams caused them to lose large numbers of logs, four companies have filed damage claims totaling more than $36,000. The Coos Bay Pulp Co. of Anacortes asks $15,000; Puget Sound Pulp & Timber Co., Bellingham, $10,000; C. B. Lumber & Shingle Co., Everett, $8,537 and John S. Pankratz, Seattle, $3,092.

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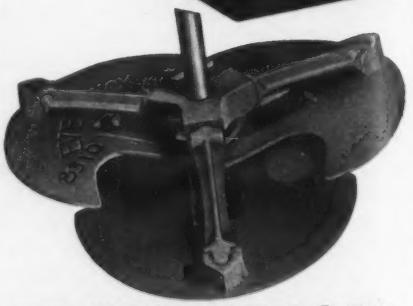

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Write for latest Everstick bulletin.

EVERSTICK ANCHOR CO.
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THE CLOSED SHOP

Key to Labor Monopoly

IF THE PEOPLE of the United States are to loosen the monopoly control now exercised by some segments of union labor and recapture the power to control their own economic and political destiny, they must come to grips with the problem of the closed shop. A satisfactory solution of that problem is as vital to the interests of the wage earner, who should be fully protected in his right to organize and bargain collectively through representatives of his own choosing, as it is vital to the interests of the nation as a whole.

By the closed shop, which unfortunately is a term that seems to shed more heat than light, I mean any shop in which the worker must make his peace with a union in order to have a job. There are approximately 13½ million union members in the United States. Of these about 10 million are governed by arrangements calling for "closed" shops, union shops, maintenance of membership provisions and similar devices which make good standing in a union a condition to holding a job.

Such arrangements raise serious issues about what is commonly presumed to be the basic American right to work. Also, closed shop arrangements lie at the root of the dominant economic power now exercised by some labor leaders.

The problem of reducing the power of these labor leaders to proportions that make it safe for democracy is the age-old problem of monopoly. In an earlier era this problem was created largely by businessmen who sought to escape the restraints of competition by combinations or agreements to control prices and production. Such efforts are still attempted and must be curbed by law.

Union Labor Monopoly

But, after more than a decade during which a monopoly position for organized labor has been aggressively promoted by the federal government, the major monopolists today are those labor leaders who wield the power of enormous nationwide unions. About 90% of the soft coal miners do the bidding of John L. Lewis. A like percentage of the auto workers are represented by the United Automobile Workers of the C. I. O. About 80% of the production workers in steel are members of the United Steel Workers, C. I. O. No single corporation has more than a fraction of the economic power that is concentrated in these unions. And if corporations were to combine their power to cope effectively with that of these union monopolies they would unquestionably find themselves charged with violating the federal antitrust laws.

In its national sweep, the monopoly power of unions rests largely on their exemption from the federal antitrust laws. My previous editorial in this series (the 53rd) discussed the desirability of removing that exemption. The local roots of this monopoly power are often embedded in closed shop arrangements.

Closed Shop in Coal

An illuminating case in point is provided by the United Mine Workers, whose leader John L. Lewis has graciously given the country a 3½-month reprieve from "the hysteria and frenzy of an economic crisis," as he himself termed it. During that latest crisis the dispatches from the soft coal fields reported that the miners were standing behind John L. Lewis almost to a man. And the implication usually was that the driving forces of the strike were loyalty to Lewis and the prospect of economic gain.

Underlying that performance, however, and basic to it was an agreement in the soft coal fields providing that "as a condition of employment all employees shall be members of the United Mine Workers." Hence to hold a job in 90% of the soft coal industry which is governed by contracts with the United Mine Workers, a miner must not offend the union. To avoid offense the union member must even be careful in criticising what his union

does. *Suspension from the union for six months, and hence from the right to hold a job,* is the penalty imposed by the United Mine Workers constitution for circulating a statement "wrongfully condemning any decision rendered by any officer of the organization."

The willingness of the miners to follow Lewis until the country froze over was not, of course, exclusively a product of the agreement limiting jobs in the coal fields to union members of good standing. Some of it originated in bad handling of employee relations in the coal fields in years gone by. But the fact remains that Lewis' soft coal monopoly has as one of its principal foundations an agreement which gives the United Mine Workers a job-or-no-job hold on 90% of the soft coal miners.

In its extreme form, the closed shop not only makes union membership a condition of employment but narrowly limits the numbers admitted to union membership and hence to the opportunity to work. In this way it is used to enforce restriction of output and working rules which would never stand up under free competition.

Fair Dealing

The closed shop raises major issues of personal freedom and fair dealing between individuals. As matters now stand, closed shop agreements require employers to discharge workers who lose their good standing in the unions involved. At the same time they frequently impose no requirement on unions to grant membership to law abiding and technically qualified persons. Many unions with closed shop agreements refuse to grant membership on the basis of competence. Thus, qualified workers are denied a fair chance to hold a job.

In its dealings with the closed shop issue the federal government has been pushed into a self-contradictory position. The National Labor Relations Act (the Wagner Act) provides, and properly, that "employees shall have the right . . . to bargain collectively through representatives of their own choosing." In furtherance of that basic proposition, the Wagner Act also provides that "It shall be an unfair labor practice for an employer . . . by discrimination in regard to hire or tenure of employment to encourage or discourage membership in any labor organization . . ." Standing alone, the provision would clearly outlaw the closed shop.

But then, to favor the closed shop, the Wagner Act turns right around and provides that "nothing in this Act . . . shall preclude an employer from making an agreement with a labor organization . . . to require, as a condition of employment, membership therein," provided that certain conditions of representation are fulfilled. This places the National Labor Relations Board in the impossible position of trying to administer a law which simultaneously points in opposite directions.

In successfully contending that there should be no closed shop arrangements on the railroads, the late Joseph Eastman, Federal Co-ordinator of Transportation, said, "If genuine freedom of choice is to be the basis of labor relations under the Railway Labor Act, as it should be, then the yellow dog contract and his corollary, the closed shop . . . have no place in the picture." The so-called yellow dog contract, which requires a worker to agree not to join a union as a condition of employment, has long since been outlawed.

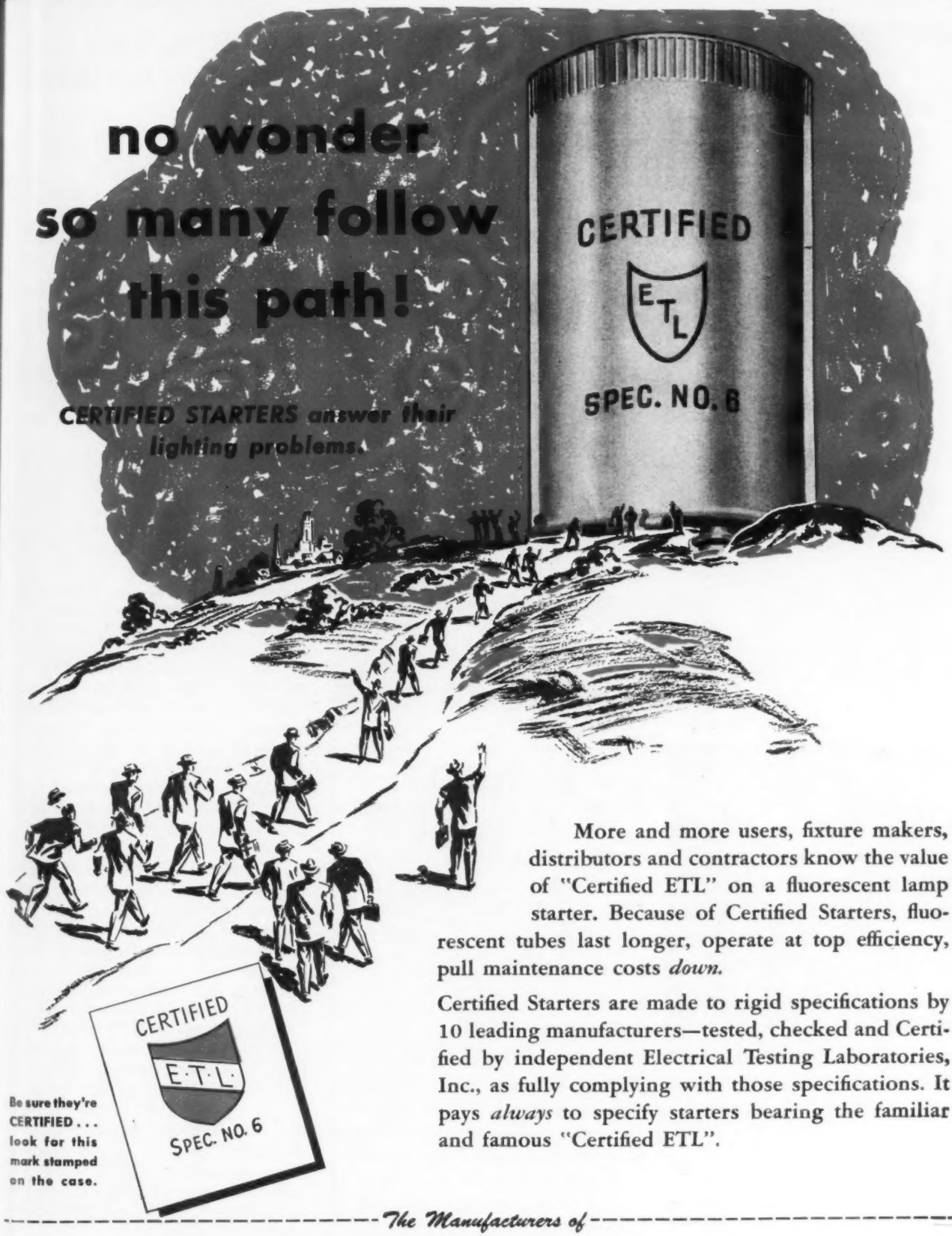
At one time the closed shop was defended as a protective device for feeble young unions struggling against predatory employers. But a mere glance over the current economic scene discloses that the time when that argument was supported by the facts is past. Now it is the labor leaders who frequently exercise decisive economic power.

At elections in November three more states, Arizona, Nebraska and South Dakota, passed constitutional amendments outlawing the closed shop. In doing so, they joined six other states, which, in one way or another, have restricted the closed shop. The South Dakota amendment presented the basic issue created by the closed shop in simple and direct terms when it declared that "The right of persons to work shall not be denied or abridged on account of membership or non-membership in any labor union, or labor organization."

That issue must be squarely faced by the new Congress if its first order of business, the labor crisis, is to be resolved.

James H. McGraw, Jr.

President McGraw-Hill Publishing Company, Inc.



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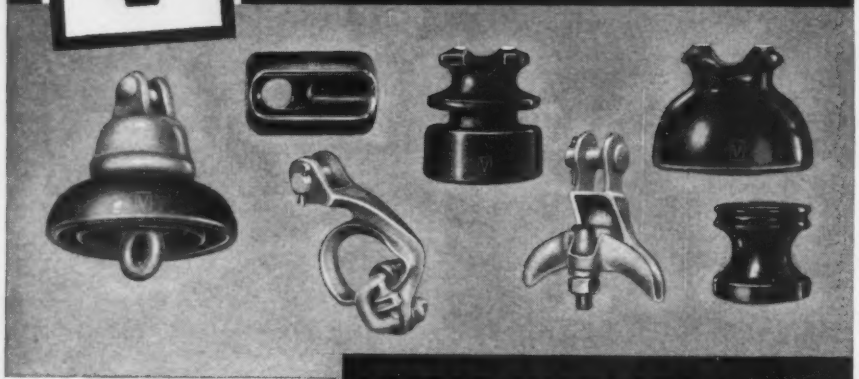

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B. C. ELECTRIC STARTS BRIDGE RIVER COFFER DAM

Construction has been started on the $1,800,000 diversion dam, part of the $50,000,000 Bridge River power development program of the B. C. Electric Railway Co. The dam is being built 130 miles north of Vancouver, and general contract has been placed with the Northern Construction Co. and J. W. Stewart Ltd., Vancouver.

Water will be diverted from Bridge River through a tunnel under Mission Mt. to Seton Lake about 1,200 ft. nearer sea level. A new power house will be built at Seton Lake and contract has been placed with the Northern Construction Co. and Hume & Humble Ltd. for construction of a high-tension line from Seton Lake to Vancouver, at a cost of $2,500,000.

Construction of the coffer dam is at present requiring 240 men. This dam is of earth and rock fill, with a core of steel sheet, and will be 60 ft. high at its crest.

An item in connection with the construction program is the hauling of 12,000 tons of equipment over twisting mountain roads, which climb 3,000 ft. in five miles and descend 2,000 ft. in the next four. The haulage contract has been let to the Neal Evans Transportation Co. of Shalalth and Vancouver.

Part of the work of clearing 30 miles of transmission line right-of-way and installation of footings for steel towers has also been placed with the Jamieson Construction Co. of Vancouver.

● APPROXIMATELY $1,000,000 will be spent by B. C. Electric Railway Co. on development of its new substation in Burnaby, B. C., according to T. Ingledow, company vice-president. Ingledow said that the present HornePayne substation of the company at Halifax and Esmond streets will be used as the site. The new station will terminate the transmission line from the new Bridge River power development of the company.

● IMMEDIATE CONSTRUCTION of a substation just west of Corvallis, Ore., has been approved by Bonneville Power Administration, to provide an additional delivery point to the Benton-Lincoln Electric Cooperative. The 3,000-kva. station will tie into BPA's Albany-Toledo 115,000-volt line.

● HUME & RUMBLE, electrical contractor of Vancouver, B. C., has received a contract valued at about 75,000 for extension and development of the rural electrification system of National Utilities Corp. in the Alberni Valley near Port Alberni, B. C.

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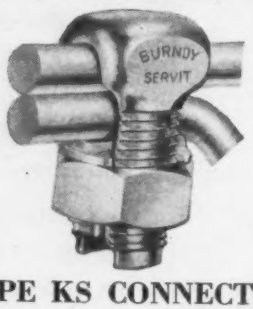

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ELECTRIC PLANT REPAIRS NECESSARY, CITY IS TOLD

Ellensburg, Wash., must spent approximately $100,000 on repairs to the city electric plant on the Yakima River and the power ditch, if it continues to operate the plant, Superintendent Lewis Ambrose of the municipal light department reported in a survey submitted to the city council.

The necessity for extensive repairs is expected to hasten a decision on the question of continued operation or abandonment of the hydroelectric plant. It is not now large enough to meet city requirements, and stand-by service is furnished by Bonneville. Surveys indicate the city could approximately equal its present power cost by purchasing its entire requirement for BPA.

● UTAH COPPER CO. is adding $3,000,000 in equipment to electrical generating plant at its Arthur, Utah, mill. D. D. Moffat, president and general manager, reported that foundations are being placed for two new 25,000-kw. generators and another boiler, with auxiliary pumps and other equipment. The plant, which because of wartime shortages was placed in operation in 1944 when only partially completed, is expected to be finished late in 1947 at a final cost of more than $10,000,000. Present generating capacity of the electrical plant is 50,000 kw.

● A POWER PLANT to house 15 generating units rated at 75,400 kw. each is planned in connection with a dam proposed for construction across the Columbia River three miles above The Dalles, Ore., Col. O. E. Walsh, U. S. district engineer, told the Washington State Reclamation Association at Yakima. Initial cost, based on 1940 prices, would be $90,000,000 for three generating units and the dam. Eventual cost would be about $132,000,000, it was estimated.

● AMONG SUPPLY CONTRACTS granted recently by USBR for materials to be used at Grand Coulee were these for electrical supplies: Tubbs Electrical Co. of Spokane, $2,293 for heaters; Dictograph Products Inc. of Seattle, $1,068 for a communications system; Electric Sales & Service of Grand Coulee, $4,078 for electric heaters.

● ECONOMIC BASE for Power Markets in Skagit County, Wash., has been published by Bonneville Power Administration in cooperation with the Skagit County Planning Commission.

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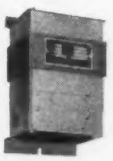
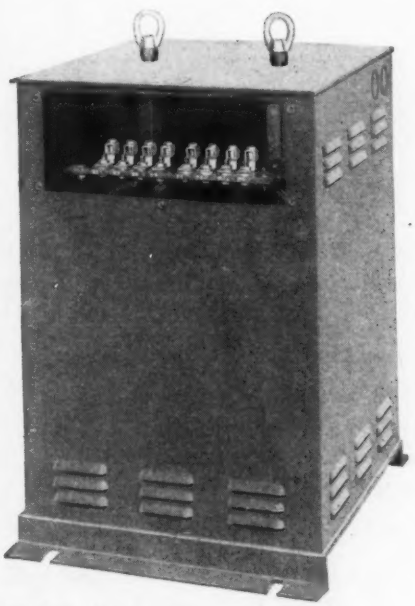
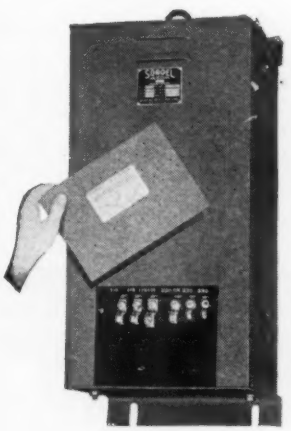

1/4 KVA.
Single Phase
460/230 to
115 Volt

5 KVA,
Wall Mounting Type


50 KVA. Single phase.
Floor Mounting Type.
With cover of connection compartment removed, showing solderless terminals.


15 KVA. 3-phase
Wall Mounting Type
Showing connection
Compartment with
solderless terminals

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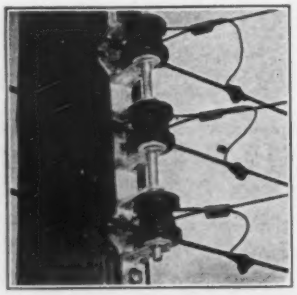
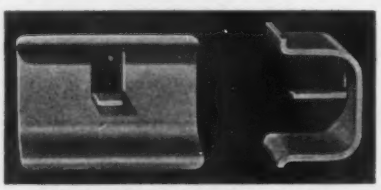


Matthews Wire Clips

Many power companies are using Matthews Wire Clips for holding service drop wires. They save time and waste of twisting wires. Make neater job.

The patented locking tongue is inserted between the wire forming the loop and the clip is clamped tight over the insulation with a pair of pliers or wire connectors, as illustrated.

Thousands of Matthews Wire Clips are used in preference to serving stranded guy wire above the clamp. Save guy strand and make neater job in less time. The patented locking tongue prevents slipping.



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RECLAMATION BUREAU SIGNS POWER EQUIPMENT CONTRACTS

Three contracts, totaling $1,328,942, for hydroelectric power equipment were awarded recently by the Bureau of Reclamation. The contracts call for the delivery of four turbines and four generators to be installed at the Estes Park and Marys Lake power plants on the Big Thompson River in Colorado.

Allis-Chalmers Mfg. Co. of Denver received a $537,592 contract to supply three vertical-shaft, 21,000-hp. turbines for the Estes Park plant. Three 3-phase, vertical shaft generators of 15,000-kw. capacity for the same plant and an 8,100-kw. generator for Marys Lake will be built by the General Electric Co., Denver, under a $626,740 contract. A $164,604 contract for an 11,300-hp. turbine for the Marys Lake plant was awarded to the Newport News Shipbuilding and Dry Dock Co., Newport News, Va.

● Two Western communities, Oak Creek, Colo., and Cle Elum, Wash., are among the first seven in the United States to receive rural telephone service by power-line carrier, under a system worked out by American Telephone and Telegraph Co. At Oak Creek, the Mountain States Telephone & Telegraph Co. and the Yampa Valley Electric Assn. Inc., are participating in the development; at Cle Elum, Pacific Tel. & Tel. and the Kittitas County PUD are participants. Initially, equipment will provide one channel for telephone service, each serving six subscribers.

● Portland General Electric Co. is making improvements at its Mt. Scott radio station to house a two-way FM transmitter. The station will operate on a frequency of 75.5 mc., with a power of 250 watts; call letters will be KAZJ. PGE now has a fleet of 35 two-way-radio-equipped cars; expects to increase this to 89.

● Telluride Power Co. is building a 5-mile, 44,000-volt line in Beaver Canyon, L. R. Fournier, general superintendent, reported. The new line will set up an alternate source for the area, which is now on a line which also serves Sevier Valley.

● Western Electric Supply Co. has been awarded a $50,000 contract by the Tacoma, Wash., Municipal Board of Contracts & Awards for furnishing the city's 1947 supplies of light meters.

● Pasco, Wash., city council has approved Pacific Power & Light Co.'s recommendation for installation of 196 additional overhead lights in business and residential areas. The new system will provide 176% more light at an 82% increase in cost—$339 instead of $186 per month—it was stated. Plans call for 127 radial-wave lights with 2,500-lumen intensity in residential districts and 4,000 to 6,000 lumen in heavy traffic areas and at other danger points.

Electrified Rail Extensions Seen for Western States

Two railroads are planning electrified line extensions in the West, according to T. M. C. Martin, railroad electrification engineer for Bonneville Power Administration. The Great Northern, which has 72 mi. of electrified line across the Cascades, is considering electrification from Skykomish, Wash., to its Seattle terminal. The Denver & Rio Grande Western is studying electrification between Denver and the Moffatt tunnel near the summit of the Rockies.

Eventual electrification of all 8,800 mi. of mainline railroad trackage on the Pacific Coast was predicted by BPA engineers, who estimate cost at $440,000,000. Bonneville Administrator Paul J. Raver recently asked FPC for permission to set up a special rate schedule for railroads based on approximately 4 mills per kilowatt-hour.

● The Grays Harbor PUD at Aberdeen, Wash., has awarded two contracts for power line work. Puget Sound Electric Co., Seattle, will construct a power extension to Taholah for $16,750 and change the power line between Copalis and Ocean City from a single to a 3-phase system for $3,600. Materials, to be furnished by the PUD, will bring total cost of the projects to $35,000.

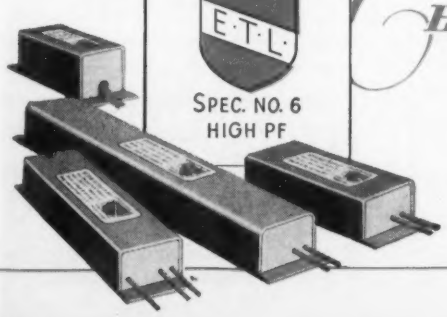
● Construction of a 115,000-volt line from The Dalles, Ore., to Goldendale, Wash., has been approved by Bonneville Power Administrator Paul J. Raver, and will be started not later than May 1. The $430,000 line will serve the Klickitat County PUD, which is seeking to acquire Pacific Power & Light Co. transmission facilities in the area.

● General Electric has been awarded a $129,946 contract by the City of Port Angeles, Wash., to supply four electric power substations for the city's primary power distribution system, with delivery promised in 23 months. General Electric will also furnish 108 new floodlight lenses for Civic Field at $10.80 each.

"There's an 'inside' story on fluorescent lighting you ought to know!"

The big story is . . . *inside the fluorescent lighting fixture!*

That's where you'll find the BALLAST—the heart of the tube and fixture performance and operation. And CERTIFIED BALLASTS built to rigid specifications—tested, checked and CERTIFIED by impartial experts, Electrical Testing Laboratories, Inc., as completely meeting those specifications—assure longer fluorescent lamp life, most light from lamps, greater economy. Be sure the Ballasts you specify and use bear the famous ETL Certified Label next to the maker's name.



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HOW TO MAKE POLES LAST LONGER

Just off the press. A factual booklet describing 12 years field experience with OSMOPLASTIC in ground line treatment of standing poles as well as other timbers. Explains the Osmoplastic method of treatment in detail. Write for your copy.

OSMOSE WOOD PRESERVING CO. OF AMERICA, INC. 1437 BAILEY AVE., BUFFALO 12, NEW YORK

TRADE notes

California Electric Supply Inaugurates Merit Plan

A merit plan, whereby California Electric Supply Co. employees receive extra compensation for extra effort, was announced by President L. B. McDonnell of that company at a Christmas party attended by over 50 employees. Bonus checks amounting to a half month's salary were presented to each employee at the time, and J. Fasano, electrical supplies manager and purchasing agent, for 25 years of loyal service received a check for $1,000. E. L. McDonnell, secretary-treasurer, gave an inspiring talk tracing the company's history. L. B. McDonnell, in announcing the merit plan, stressed the importance of better service to customers, employee cooperation, and courtesy in telephone response.

"We can do much to improve our service to our customers," said McDonnell, "one of the most important things to remember in 1947 is the telephone. Drop everything when it rings, because it means orders. Over 70% of the wholesalers business is done over the telephone, so you can see how important it is to answer the telephone promptly and courteously."

New San Francisco Plant Features Built-In Lighting

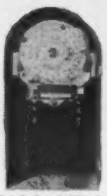
From association of men prominent in theatrical lighting, has come a new organization, Associated Lighting Service, 488 Grant St., San Francisco, specializing in the manufacture of built-in lighting units, chiefly incandescent, for store and other lighting applications. Carlton Schammel, formerly manager of Associated Theatrical Service, and George Smedberg, lighting engineer, formerly connected with Century Electric in New York City, are partners in the new enterprise. The firm has shops in which it makes up the parts in quantity, and can make delivery in two or three weeks from the assembly of various parts. Master rings are available within 24 hours. All equipment has both union and Underwriters' Laboratories labels. Some fluorescent equipment, although chiefly for cove lighting, will be built. Theatrical lighting will be tailored to fit, and arrangements are made to supply switchboards, interlocked panels, border and footlights, etc.

● THE FRANK H. BRAN CO. will be sales representative for Silv-A-King lighting equipment in the states of California, Arizona and Nevada and in the territory of Hawaii, according to recent announcement of the Bright Light Reflector Co., Bridgeport, Conn. Bran has offices in Los Angeles and San Francisco.

● CANADIAN GENERAL ELECTRIC CO. Ltd. has taken out a building permit for construction of a reinforced concrete building at 711 Broughton Street, Victoria, B. C. The $40,000 building will be used as display rooms and warehouse. Contract has been placed with G. H. Wheaton, Victoria.

● ALLARD'S Furniture & Electric has opened for business at New Westminster, B. C.

"A TORK CLOCK IS A FAMOUS NAME FOR TIME SWITCHES"



TORK CLOCKS

NOW WITH ASTRONOMIC DIALS

For all types of electrical switching and time control, Tork Time Clocks will control operations efficiently and automatically. Self-starting, all-electric. For minutes, hours, days or weeks. Special models designed to specifications.

WESTERN REPRESENTATIVES

Write for Bulletins
TORK CLOCK CO.
Mt. Vernon, N. Y.

George H. Curtiss, 222 29th St., Oakland 11, Calif. Veale Elec. Equip. Co., 445 E. 3rd Street, Los Angeles 13, Calif. Abbott Elec. Co., 1101 Eastlake Ave., Seattle 9, Wash. Stevens Sales Co., P. O. Box 2238, Salt Lake City 14, Utah. H. George Sheffer, P. O. Box 1587, Phoenix, Ariz.

WANTED
ELECTRICAL PROJECT ENGINEER

One (1) experienced graduate engineer, responsible charge electrical engineering and design of steam-electric and hydro-electric power plants and high voltage substations. Applicants please furnish personal data and Experience Record.

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New and Rebuilt

ELECTRIC EQUIPMENT CO.
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Research Engineer Tours Western States

The electronics section of the Industrial Department, San Francisco Chamber of Commerce, sponsored a meeting at Western Merchandise Mart auditorium, Jan. 16, at which Dr. Phillips Thomas, research engineer, Westinghouse Electric Corp., presented his dramatized story of research in electronics. The various engineering and electrical groups in San Francisco were invited. Dr. Thomas also addressed the Los Angeles Electric Club presenting the same demonstration and talk on Monday Jan. 6.

He is making a tour of the Western states with this talk, in a similar manner to the previous talks on science which he gave throughout the country in prewar years. He was in Caspar, Wyo., and in Greeley, Denver and Pueblo, Colo., during December; in San Diego, Los Angeles, Santa Clara, Calif., San Francisco, Berkeley, Tacoma, Seattle, Portland, Corvallis, Ore., Spokane and Butte during January. Scheduled for February were meetings in Salt Lake City and in Albuquerque, N. M. Sponsors included Electric clubs and leagues, power companies, technical societies, universities, Chambers of Commerce and service clubs.

● ELECTRONIC Chemical Engineering Co. has been incorporated with Robert P. Sibley, president; Kenneth A. Smith, vice-president-treasurer, and Charles Larzelere, secretary. The company plans to carry on the business of the former partnership and to go into the manufacturing of the Electronofire hot dog cooker. It will also promote sale of bonding equipment. A second corporation, Electronetone Inc., has been set up to handle sound-on-film development. Kenneth Smith is president of this corporation, with L. R. Streeter, vice-president; R. P. Sibley, treasurer, and Charles Larzelere, secretary.

● VIC-MAR ELECTRICAL has opened a new retail store and office at 2022 Douglas St., Victoria, B. C., establishing a subsidiary of the Victoria Marine Electrical Engineering Co. Ltd., of which John R. Potts is general manager. The new establishment will feature major and minor appliances and electrical fixtures and will also handle all types of electrical installation work.

● WIRE ONCE—not once a year is the theme of an adequate farm wiring slide film, *Wired For Life*, released by General Electric Co. construction material division, and available at $25 a copy.

". . . the greatest power system expansion program in the history of the Pacific States."

These are the words that McGraw-Hill PULSE BEAT of INDUSTRY uses in its December, 1946 "Forecast" issue* to describe the results of the Pacific Coast postwar boom. It goes on to emphasize that

". . . an electrical market without precedent in any region at any time will be the inevitable result."

THE WESTERN program will add 2½ million kilowatts of new generating capacity by the end of 1949. During this period buyers and specifiers of electrical equipment will be in the paradoxical position of not having time for lengthy interviews with salesmen and of being in need of lots of information about many products.

THIS MEANS that the April Manufacturers' Directory Issue of ELECTRICAL WEST will be of greater service to buyers and to manufacturers than ever before. The only Directory of western representatives of electrical manufacturers, it will be a useful tool for busy electrical people during 1947.

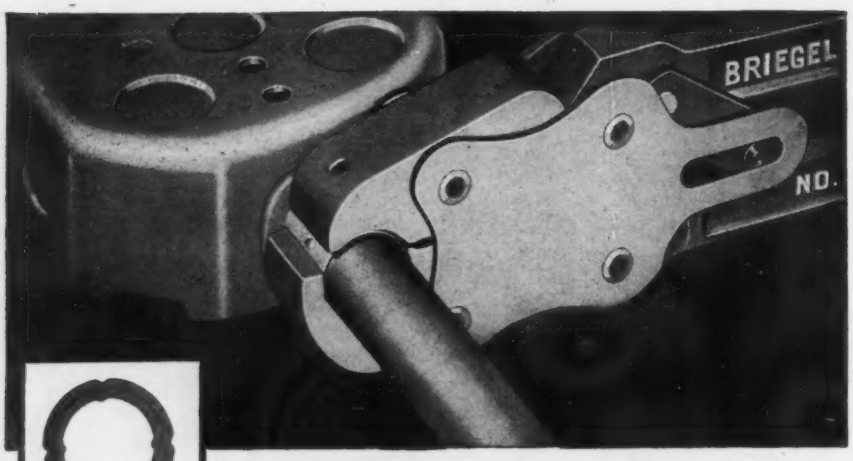
ADVERTISING in the Directory by manufacturers and by manufacturers' agents will powerfully supplement the Directory listings. It is to the advantage of user and advertiser to present the complete story of products and facilities. Plan today your advertisement for this issue. Forms close March 10.

The 15th Annual Manufacturers' Directory Issue, April, 1947

ELECTRICAL WEST

Spokesman for the most highly electrified section of the U. S.

*We will gladly send a copy of this issue of the PULSE BEAT to those who request it.



Cross section Showing Indentations.

E·M·T·UP THE QUICK WAY
Two Squeezes and it's Set

TWO QUICK SQUEEZES give you Finer, Faster Conduit Connections. B-M Fittings do away with the twisting, turning and tightening of nuts and save you valuable time and materials. Then too, they are stronger, neater and much easier to work with in tight places. Start using B-M Fittings today. Have more satisfied customers—more profits from each job!
(All B-M Fittings carry the Underwriters Seal of Approval)

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BUILT TO ORDER IN A HURRY!!

When you are installing or re-arranging—and need a special transformer to exactly match your requirements—call on us. We can deliver in a week to 10 days.

Specify scattered transformers to eliminate duplicate conduit runs and save on power costs.

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Electrical Insulation

The Spaulding Fibre Company, Inc.
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LOS ANGELES 15 SEATTLE 1
1325 San Julian St. 166 Jackson St.
SAN FRANCISCO 3
1889 Mission St.

● BANDOLI McINTYRE Co., at 1025 N. Highland Ave., Los Angeles, is a new appliance distributing organization created by Marvin S. Bandoli, formerly national sales manager for Nash Kelvinator Corp., and Vincent J. McIntyre, once holding that same position and later with Montgomery Ward & Co. They handle the Duchess washer made by the Appliance Mfg. Co. of Alliance, Ohio, and other appliances. Resident district managers are: George Chikar, San Diego; Bert Richards, northern territory, and Paul Martin, east and southern territory out of Los Angeles. E. F. Hamilton is credit manager and Arnt Olson, service and warehouse manager.

● SALES and engineering representatives have been appointed by Tru-Air Ultraviolet Products Co., a subsidiary of Mitchell Mfg. Co. to cover its various territories. During the week of Dec. 9 these new representatives were gathered at the Los Angeles home office for a two-week intensive training course under the direction of J. David Gladstone, chief engineer and sales manager. E. A. Nickel, sales and advertising manager of Mitchell, came west for the course, and described the company's advertising and promotional plans. Included in the group were Leo Greenwald, R. T. Bennett, C. C. Mathews Jr., Martin Fisher, Leland Prince and Howard Jorgensen.

● ALBERT E. JUDD Jr. has established a business as a manufacturer's representative at 1855 Industrial St., Los Angeles, 21, featuring industrial equipment. He was formerly sales manager, Mullenbach Electric Co., Los Angeles manufacturer of switchboards.

● UNDERWRITERS' LABORATORIES Inc. has now established a Portland office at 1123 S.W. Fifth St., where its local inspector, Mr. Tracy, makes his headquarters. This, and the Seattle office, at 1118 Alaska Bldg., is under the supervision of Ray J. Larrabee, who makes his home in Seattle.

● G. S. PARSONS has secured a Lincoln Electric dealership and has opened a business in San Diego. Parsons recently returned from service with the army occupation forces in Japan. He has been with Lincoln Electric for nearly 14 years and at one time was at the Los Angeles factory branch office.

● TRIANGLE PACIFIC Co., San Francisco and Los Angeles, has changed its name to PACIFIC ELECTRIC SALES Inc., as of Jan. 1. The former partners are its sole owners, although the organization has been incorporated.

● MODERN APPLIANCES AND ELECTRIC, Kelowna, B. C., is installed in new and enlarged quarters. The addition is 30x80 ft., and triples the floor space of the store to make it one of the largest electrical show rooms in interior British Columbia. Jack Buckland, manager, reports that the original showroom will be used for display of major appliances. A feature of the new showroom is a 28-ft. mirror paneled gift bar, used for display of novelties. There is also a large record department with private listening booths.

● GORDON & ANDERSON LTD. has opened a department store in Prince Rupert, B. C., featuring hardware, furniture, electrical appliances, draperies and gift novelties. Other commodities will be added as the business develops. The new store has 15,000 sq. ft. of floor space and is the largest mercantile establishment north of Vancouver and west of Edmonton. The new store is housed in the Federal Bldg. block in Prince Rupert.

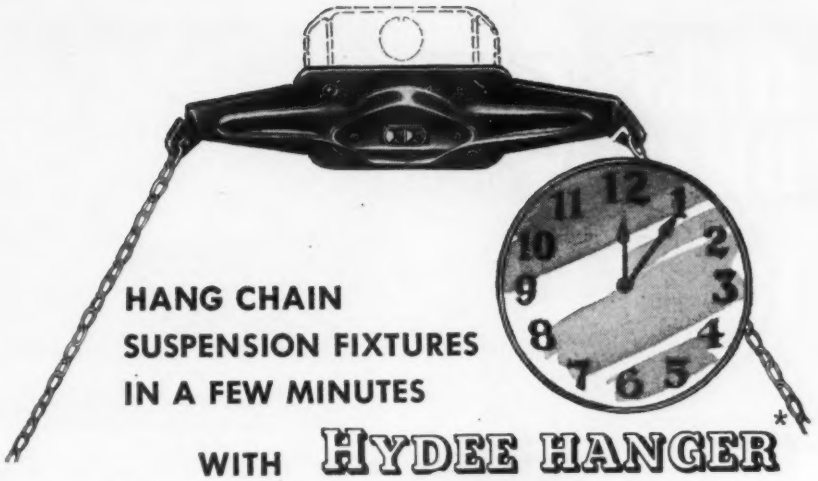
● KALMAN BRAUNER, proprietor of Puget Sound Electric Co., and president of the Seattle Electrical Contractors Assn., has announced that he will open an electrical merchandising store at 1211 Rainier Ave., Seattle, early in the year. Headquarters are at 2135 Fifth St., where the contracting shop is located.

● ALTORFER Bros., makers of electric washers and ironers, are represented in the West by: San Diego Standard Electric Corp.; Modern Household Sales Inc., Los Angeles; Sunset Electric Co., Seattle, Spokane and Portland; Mountain States Distributors, Salt Lake City.

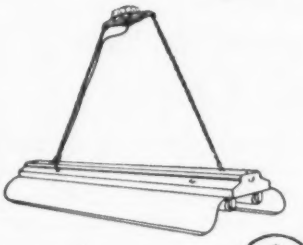
● COLUMBIA STEEL Co. will purchase assets and inventories of Consolidated Steel Corp., a California corporation. Consolidated is engaged in the fabrication and erection of structural steel, plate and sheet products; has its major plants at Los Angeles and San Francisco.

● BROWN BROS. ELECTRIC Ltd. has been incorporated with authorized capitalization of $10,000. The firm will engage in the wholesale and retail electrical supply business and has offices at 727 20th St., New Westminister, B. C.

● PACIFIC UNION MARBELITE Co., Los Angeles, has changed its name to PACIFIC UNION METAL Co., as of Jan. 1. Ralph G. Vanden Boom is president and Edward J. Masline, general manager.



HANG CHAIN SUSPENSION FIXTURES IN A FEW MINUTES WITH HYDEE HANGER*



Just connect wires – screw to outlet box. No centering, punching, drilling. No tools except a screwdriver.

Complete with receptacle, two 5-foot chains, "S" hooks and cord clips. Self-grounding – you can use 2-wire cord and plug. Fits standard 4" or 3¼" outlet box or plaster ring. $1.65 each list

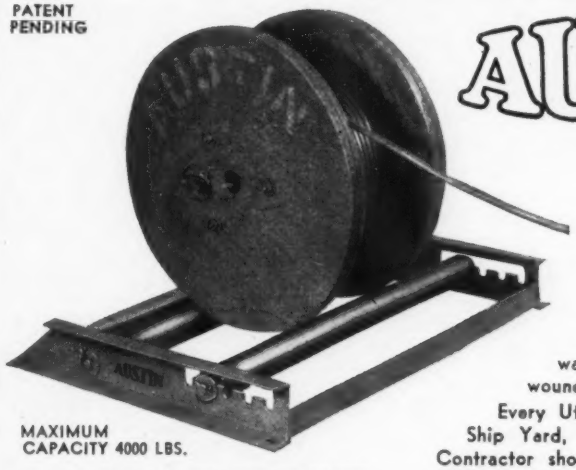
Day-Brite Lighting, Inc., 5412 Bulwer Ave., St. Louis 7, Mo. Nationally distributed through leading electrical supply houses.

In Canada: address all inquiries to Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

*Patent No. D-141024, others pending. Underwriters approved

IT'S EASY TO SEE WHEN IT'S DAY-BRITE Lighting

PATENT PENDING



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NO. 600 REEL ROLLER

A new quick, easy, safe way to dispense any material wound on a reel.

Every Utility, R. E. A. Cooperative, Ship Yard, Railroad, Wholesaler and Contractor should have several AUSTIN REEL ROLLERS. When pulling one or more cables into conduit use an AUSTIN REEL ROLLER for each cable. Can be mounted stationary or used on the job as a portable device—ideal for service and repair trucks.

MAXIMUM CAPACITY 4000 LBS.

9 OUTSTANDING ADVANTAGES

(1) Ramp—makes it quick, easy and safe to load the reel.
(2) Back roller is slightly higher, preventing the reel from being pulled off the roller when cable is removed.
(3) Reel rolls on grease packed flanged ball bearings with the greatest of ease and safety. No backlash.
(4) Thumb screw, which when tightened, prevents roller from turning for easy and safe removal of reel.
(5) Lag screw hole in each corner for stationary mounting. Hole in each side for bolting rollers together.
(6) Heavy steel frame, painted bright orange, not only adds to its appearance, but, also, makes it readily visible on the floor which helps to eliminate accidents.
(7) Five adjustable slots to take various reel diameters. No screws, washers or cotter pins to remove—simply raise up the roller and slide into the slot required.
(8) Will take any reel up to 80" in width. For larger reels, use two reel rollers and bolt together end to end.
(9) Can be used in the warehouse, on the job or truck.

PRICE $37.50 EA. NET
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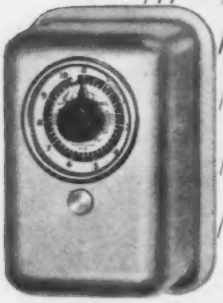
HELP BEAT THE HEAT *this summer*

MAKE *Extra Profits*



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Paragon

Timers for attic and window fans

Thousands of homes have attic and window fans . . . still others will have them.

You can make extra profits by helping these homes "Beat the Heat," with Paragon AF Timers to control the fans. Provides extra comfort and convenience. Preset, these timers control the fans automatically, for any period, up to 20 hours.

Work with all A.C. fans . . . Telechron motored (QUIET), handsomely finished drawn aluminum case . . . dial and pointer protected with clear Plastacele.

Timer motor runs only when timer is operating the fan. Setting may be changed at any time without harming the timer. Dial graduations plainly marked for easy setting. Lists at only $9.75 . . . worth that in one season . . . good for many many years.

$9.75 list price

Leading jobbers stock attic fan timers by Paragon . . . maker of "A Timer For Every Need."

PARAGON ELECTRIC COMPANY
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BUILDERS OF ELECTRICAL EQUIPMENT SINCE 1905

Burndy Engineering Co.'s new West Coast factory and warehouse at Vernon,

Westinghouse Tells Plans For New S. F. Quarters

Westingthouse Corp. has acquired a long-term lease on a three-story building at 410 Bush St. in San Francisco and will remodel it for headquarters offices, it was announced by Charles A. Dostal, vice-president in charge of the Pacific Coast district.

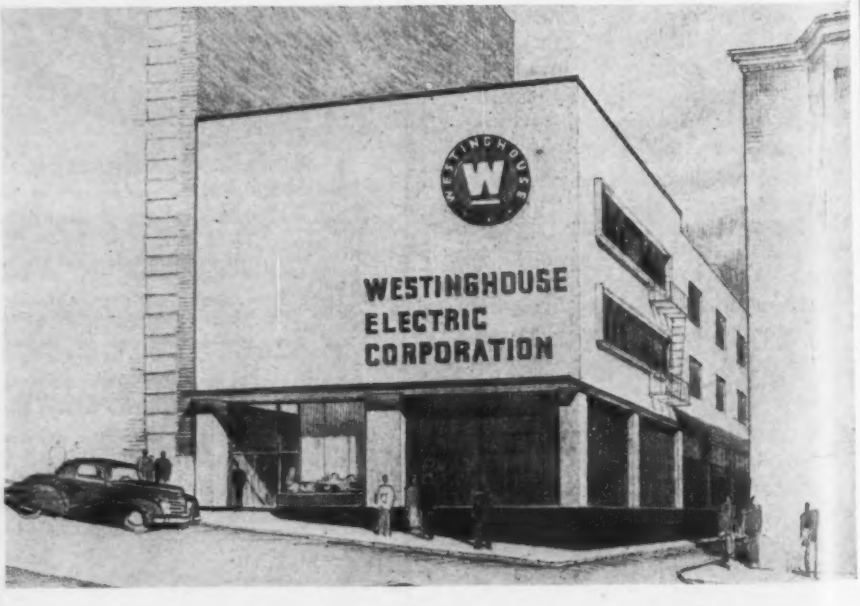
When alterations are completed about July 1, the building will provide 40,000 sq. ft. of space and will bring to one location personnel of departments and divisions now in six downtown office buildings. Westinghouse Electric Appliance Division and Westinghouse Electric Supply will not be affected by the move, the former continuing to occupy space in the Western Merchandise Mart, 1355 Market St., the latter remaining at its present location, 260 Fifth St.

The Bush St. building, formerly a parking garage, has been redesigned by Albert F. Roller, San Francisco architect. The interior will be modernized from basement to roof, providing offices and general work areas, basement storage space for company cars, and a roof lunch and sun room. The entrance lobby has been designed for display of the company's smaller products. The exterior will be in ceramic veneers and cement plaster. General contractors are Barrett & Hilp, San Francisco.

The street floor will house offices of the Westinghouse Lamp, X-ray and Elevator divisions, as well as those of the B. F. Sturtevant Co., division of Westinghouse Electric. Apparatus sales department personnel and activities will occupy the entire second floor. The Pacific Coast district executive offices will be located on the third floor, with those of its engineering and service, sales promotion, treasury and public relations departments and the Westinghouse Electric International Co.

Extending from Bush St. to Pine St., the building is 215 ft. long and 40 ft. wide.

Architect's drawing for Westinghouse Pacific Coast district headquarters



Burndy Opens West Coast Factory in California

To handle increased business in the West, Burndy Engineering Co. has opened a factory and warehouse in Vernon, Calif. The new plant will manufacture many of the connector types produced at the main factory in New York, and substantial stocks will be maintained on all of the more commonly used connectors, it was announced.

The new plant is under supervision of Lawrence Lyons, formerly a member of the company's field engineering staff. Lyons will be assisted by Keith Messent.

There is no change in the company's sales organization, which includes the following representatives: Earl S. Condon Co., Los Angeles; George E. Honn Co., San Francisco; F. W. Carlson, Seattle and Portland; Riter Engineering, Salt Lake City, and Peterson Co., Denver.

● W. Howard Leggatt has opened a new electrical store at Courtenay and Gordon streets, Victoria, B. C. Leggatt is a veteran of both world wars; he served in the Royal Navy during the first war and has just been demobilized from the navy with the rank of commander. His son, W. D. Leggatt, who has returned after three years' service with the RCAF is associated with him in the new radio, electrical supply and service business.

● Brown Instrument Co. has announced new appointments to its branch offices. These sales and service engineers have recently completed a special course at the company's headquarters. Those in the West are: Los Angeles, W. E. Dixon, sales, W. S. Blackman, service; San Francisco, J. R. Culver, sales; Portland, P. S. Williams, sales, O. G. Janacek, service.

● Rheem Mfg. Co. has announced purchase of a 56-acre industrial site north of its present Richmond, Calif., plant. According to R. S. Rheem, president, the company is still in the process of enlarging and modernizing its existing Richmond plant; the new property will permit expansion as conditions require.

● Northland Automatic Appliances Ltd., 524 West Pender St., Vancouver, B. C., has been appoined Western Canadian distributor of Bendix Automatic Home Laundries.

● Southern New Mexico is a part of the new Cutler-Hammer Southwest district. E. K. Anderson is district manager.

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PROFITS, TOO--
Sell all 3!
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ELECTRIC
SOLDERING IRONS
Experienced dealers know there is only one way to make the most profit out of 28 years' preference for Lenk quality — sell all three.
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Manufacturers of soldering equipment since 1919

Specify
ADVANCE BALLASTS
FOR UNEXCELLED PERFORMANCE
ADVANCE
ADVANCE TRANSFORMER COMPANY
Leading manufacturers of lighting fixtures use and recommend "ADVANCE" Ballasts for QUIET operation, high efficiency performance, low replacement cost and long life. "ADVANCE" Ballasts are streamlined for easy installation in fixtures and are approved by Underwriters Laboratories.
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PEOPLE

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● EFFECTIVE Jan. 1, R. S. OVERSTREET became manager of Idaho Power Co.'s central division and E. A. OLSON, formerly assistant sales manager, succeeded Overstreet as company sales manager. J. W. CROWE, who has headed the central division for 30 of his 33 years with the company, is now eligible for retirement, but will continue through 1947 to complete activities in progress. R. A. HOGG, central division sales manager, will be given the post of general office sales engineer and W. R. REED, sales supervisor, will become division sales manager.

● PARKER E. GRAY, Ogden, Utah, has been appointed superintendent of construction and maintenance of the Utah Power & Light Co.'s Rexburg, Ida., division. He had been assistant superintendent of lines and service for the Ogden division since 1942. He succeeds Parley P. Holton, who was promoted to assistant personnel director in the company's general office at Salt Lake City.

● GEORGE KINSMAN has been appointed rate engineer for Pacific Gas and Electric Co. at San Francisco. He succeeds BERGIE B. BECKETT, who has reached retirement age. Kinsman went with PG and E in October 1945, after release to inactive duty as a lieutenant commander, U. S. Navy. Previously he was with Florida Power & Light Co. for 14 years. Beckett will remain with the company as special rate engineer on individual problems.

● V. M. MARQUIS recently resigned from the Pacific Gas and Electric Co. engineering department to join the American Gas & Electric Co. He was with the latter organization for many years prior to his wartime connection with OPM and WPB.

● PACIFIC ELECTRIC MFG. CORP., San Francisco, has appointed the Edgar F. Hubert Co. as Boston sales agent, according to Edward F. Sixtus, Pacific Electric vice-president in charge of sales. The Hubert Co. address is 936 Statler Bldg., Boston, Mass.

● D. W. NURSE became manager of the Okonite Co.'s Portland office on Jan. 1. He had been in the company's San Francisco office. His new headquarters are in the Terminal Sales Bldg., 1220 S. W. Morrison St., Portland 3.

This is R. Graham Holabird, district manager for the National Electric Products Corp., who is described in box on page 124

● APPOINTMENT OF MORRIS L. FOSTER as domestic sales manager for the Sacramento Municipal Utility District was announced by Daniel K. Coyle, the district's general sales manager. Foster has had a long experience in the electric business. He was at one time with the Hawaiian Electric Co., was successively commercial agent of Coast Counties Gas and Electric Co., East Bay manager for Kelvinator, and in business for himself for 16 years. In his own business, he was both an electrical contractor and a general building contractor.

● FOR HIS PART in the rescue of a one-year-old boy from the bottom of a 35-ft. well, JULIUS R. PAPPA, PG and E troubleman, was awarded a silver medal and citation at a recent company ceremony. The company's John A. Britton Medal for Distinguished Service and the citation from President James B. Black were presented by L. J. Nevraumont, manager of the personnel department.

● CARL O. MARTIN was advanced to manager of the Pacific Coast division by Benjamin Electric Mfg. Co., effective Jan. 1. He will be responsible for sales operations in eight states. Martin succeeds Miles F. Steel, former vice-president in charge of the division, who retired after 35 years with the company.

● A. Y. MEUDELL JR. has been appointed resident representative of the G-E apparatus department at Bakersfield, Calif. He has been with the company in Schenectady, San Francisco and Los Angeles.

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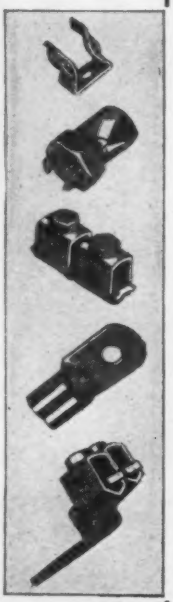

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Hugo

● HAROLD E. HUGO has been made Pacific Coast development manager for the Westinghouse Electric Appliance division. He comes to the new post from Columbus, Ohio, where he was district sales promotion manager for Westinghouse Supply, and will make his headquarters in the San Francisco office.

● RECENTLY RETIRED from service with the Idaho Power Co. are J. B. MCLAIN and W. L. HALL, both of Boise. McLain has been with the company 46 years, Hall, 39. The former was employed by predecessor companies and became division superintendent for Idaho Power when it was established in 1916. Hall was dispatcher in the Boise substation at the time of his retirement. Earlier he served as power plant and substation operator and in other capacities both for Idaho Power and predecessors.

● D. D. MCFARLANE, for more than 27 years secretary-treasurer of Newbery Electric Corp., Los Angeles, retired recently. John C. Vowels, formerly manager of Gaines Electric Supply Co., joined the Newbery Electric organization to take over some of his work.

● JAMES A. ARNERICH was appointed by Governor Earl Warren as director of the California State Department of Professional and Vocational Standards and thus heads the Contractors State License Board. E. E. Zeiss is registrar and executive secretary of the latter.

● H. L. HARPER, Graybar Pacific district manager at Los Angeles, was made a voting trustee of the company, effective Jan. 1. He replaces W. J. Drury of New York, retired.

Deaths

● OTTO A. KNOPP, 79, who retired as head of the Pacific Gas & Electric Co.'s bureau of tests and inspection in 1942, died recently in Oakland, Calif. Knopp was born in Berlin, Germany, in 1877. He received university degrees in electrical and mechanical engineering and, on leaving school, became a member of the Royal Prussian Meteorological Institute, making several balloon ascensions in connection with his work. In 1901 he went to New York and soon joined General Electric at Schenectady. Two years later he headed for the Orient but was forced to remain in San Francisco because of the Sino-Russian war. There he stayed and in March 1903 became design engineer for the California Gas & Electric Co. When Cal Electric became PG and E in 1905, Knopp went to Oakland to organize a meter test department which later became the bureau which he headed until his retirement. He held over 40 patents on electrical equipment, much of which is now in general use in the utility field.

● HEBER EUGENE PLANK, for the past 24 years manager of the General Electric Co.'s apparatus department in Seattle, died in his home of a heart attack on Jan. 10. Born in Morgantown, Pa., on Feb. 4, 1884, Mr. Plank had been with General Electric since his graduation from Pennsylvania State College in 1905, when he became student engineer, specializing in turbines. In June 1910 he was transferred to the Portland office of the company as turbine salesman; in 1913, he was assigned to the Seattle office, of which he became manager in 1922. Prominent in professional and civic activities, Mr. Plank was a member of the AIEE, Electric Club of Washington, Seattle Chamber of Commerce, and other groups.

● B. P. BAILY, industrial engineer for the Pacific Power & Light Co., died last month in Portland. He was 66. Mr. Baily was graduated from the University of Nebraska and became associated with the Northwest Light & Power Co., Pasco, Wash., in 1908. He continued on with the utility after it was merged with the present Pacific company in 1910. He served in managerial capacities in Astoria, Yakima, and The Dalles before going to the general offices in Portland.

● J. J. LITTLE, 57, vice-president and general manager of the Northern British Columbia Power Co., died recently at Rochester, Minn., following an operation, according to information received at Prince Rupert.

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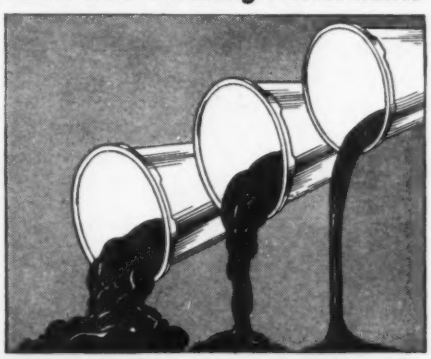

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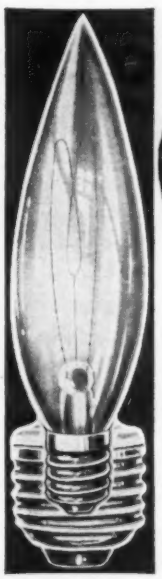

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PROFILES *of the month*

Attending the dinner honoring Hotpoint's Ray W. Turnbull in Chicago last month were, left to right: H. J. Scaife, Western manager; Sterling Cox, Sterling Department Store, Tacoma; John McDaniel, Hotpoint, Seattle; F. M. Slasor, Hotpoint refrigeration division; Ted Cortem, Ruston-Mussi, Longview, Wash.

Tru-Air Ultraviolet Products Co. recently staged a training course for salesmen at its Los Angeles home office. Taking part were, left to right, back row: Leo Greenwald, R. T. Bennett, C. C. Mathews Jr, E. A. Nickel; front row: Martin Fisher, Leland Prince, J. David Gladstone, Clyde Allen and Howard Jorgensen

Guest of honor at a dinner party last month in Los Angeles was David C. Pence, Westinghouse Supply district sales manager, retiring after 42 years in the electric industry. In the picture are, from left: L. G. Berger, Westinghouse Supply district manager; B. S. Manuel, supply company vice-president; Pence; John Duncan, Pacific Coast representative for the Oliver Steel & Iron Co.

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*California Committee on the Relation of Electricity to Agriculture.

EW—202-247

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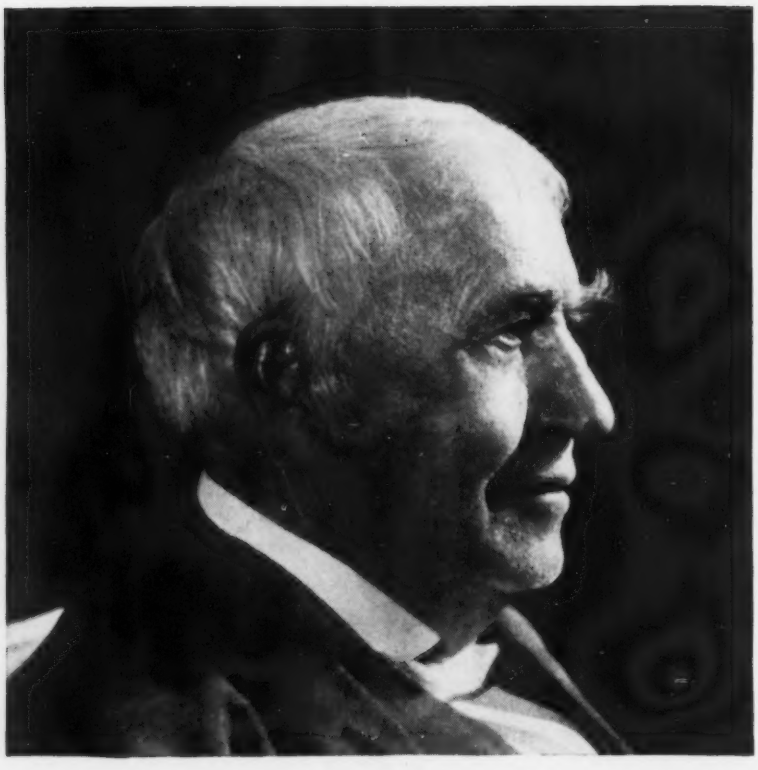

Centennial

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